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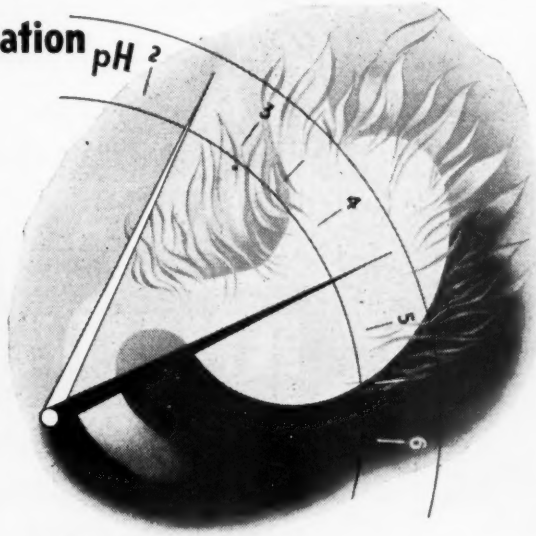

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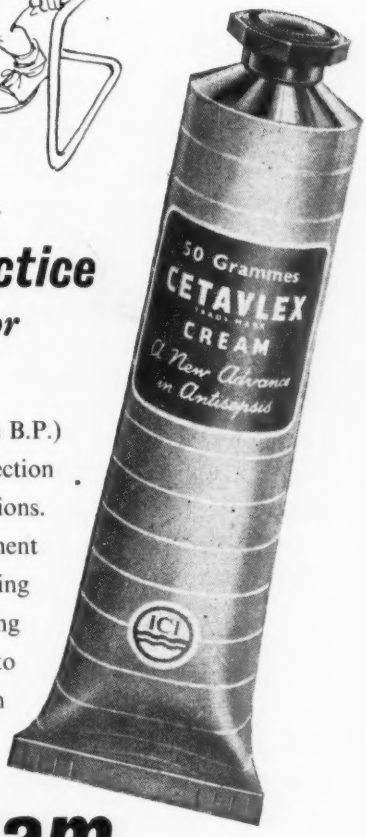

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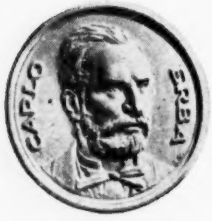

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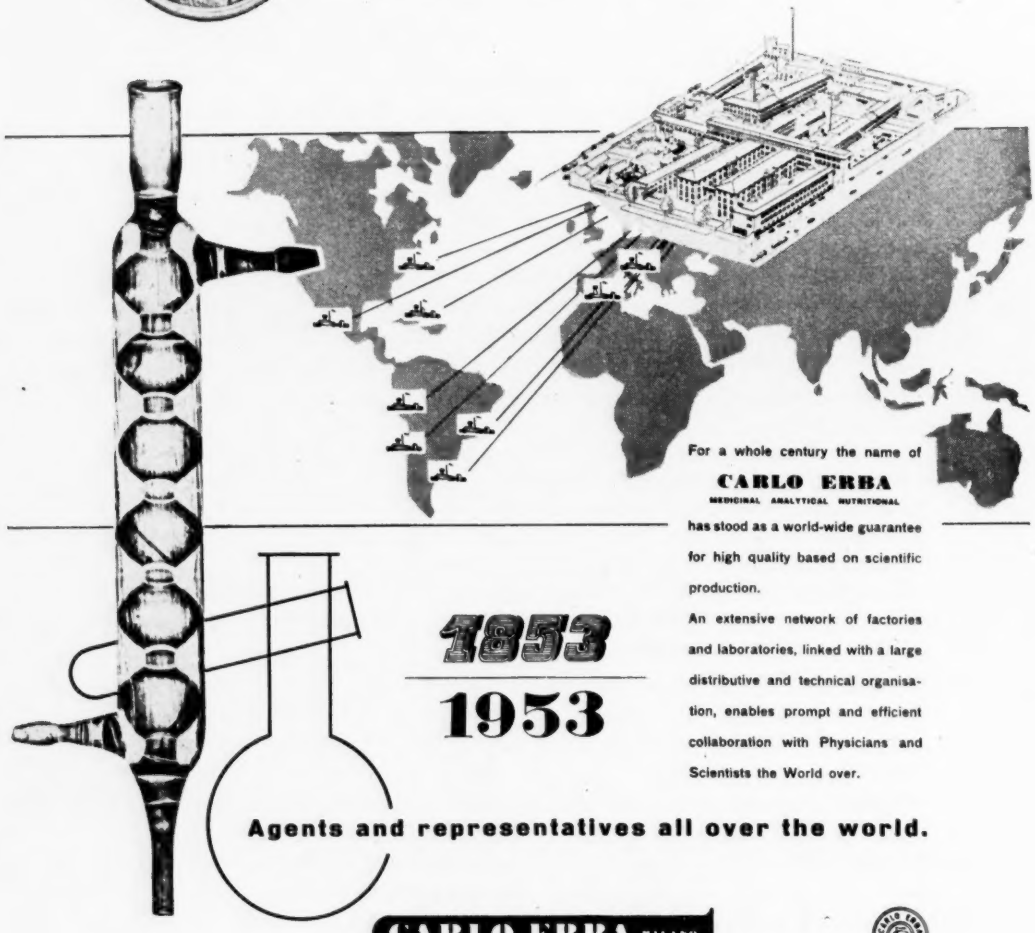

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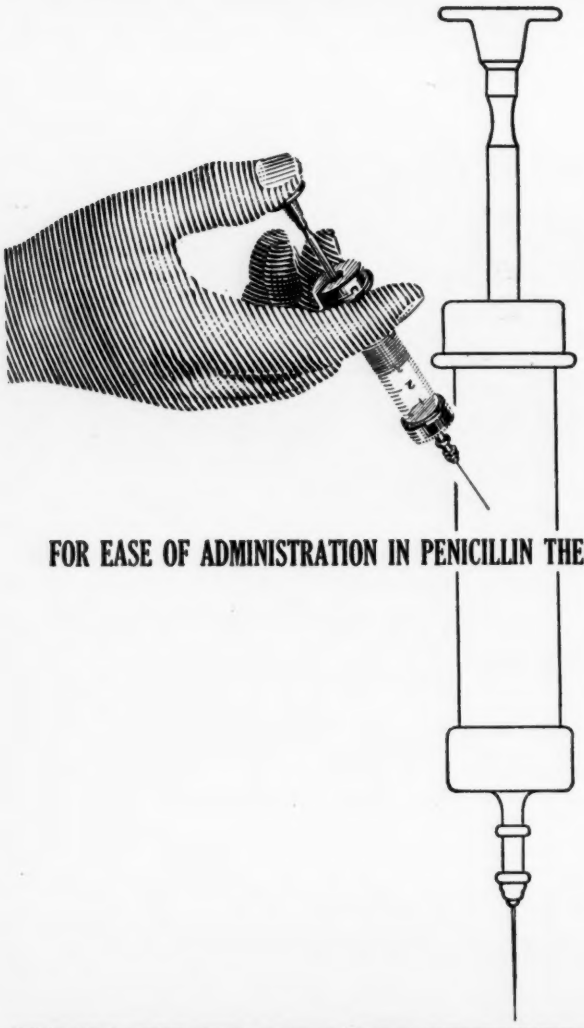

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BODY-FLUID DEPLETION *

D. A. K. BLACK
M.D., B.Sc. St. And., F.R.C.P.
LECTURER IN MEDICINE IN THE UNIVERSITY OF MANCHESTER

WHEN physicists ascend from Natural to Metaphysical Philosophy, they show us a world whose apparent solidity is merely the paradoxical expression of a changing flux of imponderable particles. Process likewise masquerades as structure in biology and medicine, and nowhere more so than in the fabric of body-fluid. Our notions of chemical equilibrium within and between the different phases of body-fluid are being displaced by concepts based on a "steady state," which requires the expense of energy to maintain its precarious stability. Bertalanffy (1950) has summarised the characters of steady states, pointing out that in open systems such as living organisms the increase of entropy—which men call death—is avoided only by the continued import of energy-rich substances. In this way, the organism can locally and transiently defy the second law of thermodynamics, maintaining a bubble of organisation in an environment of increasing disorder.

The relevance of a dynamic approach to the study of body-fluid becomes apparent when we consider either the very different composition of fluid within and outside the cells, or the rapidity with which changes induced in one phase of body-fluid evoke responses in other phases. Similarly, methods of study have evolved from the estimation of plasma composition through the classical balance techniques to the present time, in which the estimation of volumes of distribution of chemically or physically labelled markers gives us the means of assessing rapid changes in body-fluid distribution. In this first lecture I shall discuss some general aspects of body-fluid in relation to the treatment of clinical fluid depletion; in the second lecture I shall deal more specifically with experimental and clinical depletion of potassium, the predominant cation of intracellular fluid.

Total Body-water

Changes in the water content of the body can be estimated from the body-weight and fluid balance; but the total amount of water in the living body at any time can only be assessed by dilution methods. In principle, a measured amount is given of a substance which quickly diffuses through the whole of body-water; when equilibrium has been reached, the concentration of this substance in plasma water is determined, and the total volume of distribution of the substance can then be calculated. In practice, corrections have to be made for inequalities of distribution, and for excretion of the test substances during the interval between administration and the attainment of equilibrium. Urea, thiourea, antipyrine, and deuterium have all been used for this purpose. The antipyrine method (Soberman et al. 1949) agrees fairly well with estimations based on deuterium given as "heavy water." The most extensive studies with deuterium come from F. D. Moore's team at Boston (Edelman et al. 1952). They show clearly that the water content of the body decreases as age advances, and that in the same age-group men have a higher water content than women, as a percentage of total body-weight. This sex difference is probably largely a matter of the different fat content of the two sexes, for the "lean body mass" is surprisingly constant in composition (McCance and Widdowson 1951). In Moore's series, the percentage of water in the bodies of 34 young men (ages 17–34) ranged from 53·3 to 70·3, with a mean of 61·1%; the mean body-water in 18 young women was 51·2%. Dilution methods, even with deuterium, depend on equilibrium of the test substance with body-fluid; so in accepting their results we owe much to their general agreement with the results of an analytical tour-de-force carried out by Widdowson, McCance, and Spray (1951). By chemical analysis of the cadaver, they found 61·8% water in a man of 25, and 56% water in a woman of 45.

Physical State of Body-fluid

When we cut across normal tissue from which the blood has been allowed to drain, no fluid escapes, although the tissue looks moist, and we know it contains more than half its weight of water. We are obviously dealing with something which resembles a jelly rather than a water-filled sponge. Protoplasm has long been known to be a gel; and the recent intensive study of the extracellular supporting tissues, reviewed in the Goulstonian lectures last year (Kellgren 1952), has shown us that they, too, are probably in the gel form. The firmness of the gel depends largely on the degree of polymerisation of glycoprotein, and in rapidly growing tumours or in the symphysis pubis of pregnant guineapigs the "ground substance" is much more fluid (Gersh 1949–50). A simple increase in the extracellular tissue fluid, as in œdema, is also associated with the appearance of watery fluid, but the transformation from gel to sol may be incomplete, as suggested by the variable success of Southey's tubes in withdrawing œdema, and the different "feel" of œdematous tissues from case to case. Small molecules and ions diffuse rapidly through gels, but larger molecules such as inulin may be impeded; an inulin infusion takes five hours to attain equilibrium with extracellular fluid (Schwartz et al. 1949), whereas hypertonic salt has diffused through the extracellular space within twenty minutes (Black, Platt, and Stanbury 1950). Even if, as seems likely, body-fluid is in fact a solid of high water content, we can continue to use this, the accepted term, in a Pickwickian sense.

Distribution of Body-fluid

The basic division of body-fluid is effected by the aggregate of cell walls. Extracellular and intracellular fluid differ radically in their ionic composition; by comparison, plasma is strikingly similar in composition to extravascular extracellular fluid, which for brevity's sake we may call interstitial fluid. As a first approximation, it may be said that the partition of body-fluid into extracellular and cellular fluid depends on the relative amounts of sodium and potassium in the body; while the partition of extracellular fluid into plasma and interstitial fluid depends on the total mass of plasma-protein, whose osmotic attraction counterbalances the hydrostatic forces tending to expel fluid from the capillaries. The total extracellular fluid can be measured by the volume of distribution of inulin after equilibrium has been attained by long-continued infusion; Schwartz et al. (1949) in seven normal men found values ranging from 14 to 18% of body-weight, with a mean of 16·2%. Cell fluid can be measured only by the difference of estimates of extracellular fluid and total body-fluid; comparison of inulin and deuterium results gives a mean figure of 45% of body-weight. In infants, a much higher proportion of body-fluid is extracellular (Widdowson and Spray 1951).

Sodium forms more than 90% of the base of extracellular fluid (E.C.F.) and the osmotic pressure of E.C.F. depends almost entirely on its electrolyte content. Claude Bernard's vision of an osmotically stable internal environment thus implies a close relation between E.C.F. volume and E.C.F. total sodium. In his Goulstonian lectures, McCance (1936a) described experimental work on man which showed both the validity and the limitations of

* The first Goulstonian lecture for 1953, delivered before the Royal College of Physicians on Jan. 13. The second lecture will appear in a forthcoming issue.

this theoretical principle. In the first four days of salt depletion, his subjects lost weight in parallel with their loss of sodium, indicating that the osmotic pressure of body-fluids was being conserved at the expense of volume. Later on, however, the body-weight fell only slowly, while the sodium loss continued, so that the serum-sodium fell. In clinical salt depletion, the serum-sodium is usually low, indicating a rather advanced sodium depletion; we shall discuss later the bearing of this fact on therapeutic methods.

Although the volume of extracellular fluid can be plausibly related to the osmotic activity of its sodium and associated anions, evidence has accumulated of serious deviations from osmotic equilibrium within the body. Analysis of cell fluid shows a higher concentration of base than in the extracellular fluid, which led Peters (1947) to postulate the existence of "osmotically inactive base" within cells; Elkinton et al. (1948) have accepted this concept, and brought forward evidence of discrepancy between shifts of cation and of water across the cell wall, suggesting that the proportion of cell base which is inactive may change from time to time. A more radical approach is that of Robinson (1950, 1952), who discards osmotic determination of body-water distribution in favour of a continued active process of water extrusion from cells, which keeps the intracellular osmotic pressure consistently higher than that in the surrounding medium. Robinson showed that tissue slices would remain in equilibrium with "isotonic" media only so long as their oxygen uptake was normal; when metabolism was depressed by cyanide or by oxygen-lack the cells took up water even from "hypertonic" solutions up to an osmolarity of 0·58 osmols per litre. Similar active transport mechanisms are invoked by Ussing (1952) to explain the low sodium content of cells in a medium of high sodium content such as extracellular fluid. The active expulsion of sodium ions sets up a potential difference across the cell wall, and the high potassium content of cells can be attributed to a passive flow down an electrochemical potential gradient. Terner, Eggleston, and Krebs (1950) have shown that brain tissue maintains its potassium content in a saline medium containing oxygen, glucose, and L-glutamate; if any of these is missing from the medium, potassium leaves the cells, returning when the missing item of substrate is restored. The lower sodium and higher potassium content of fœtal, as compared to maternal, erythrocytes in the sheep, has been related to the more rapid glycolysis and greater oxygen consumption of the fœtal erythrocyte (Hallman and Karvonen 1949). These examples may illustrate a tendency to explain apparent anomalies of body-fluid distribution and composition in terms of active processes, dependent on the energy of tissue oxidation, rather than in terms of classical physiochemical equilibria. The final balance between these modes of thought has certainly not yet been struck. As William James says in another context, the sciences "habitually advance by zig-zagging from one absolute formula to another which corrects it by going too far the other way."

Regulation of Body-fluid Tonicity and Volume

Although the composition of body-fluid is both complex and variable from one phase to another, it is possible to find evidence of a control of the general parameters of body-fluid which transcends the detailed operations on separate ions and molecules. There is a suggestion from McCance's experiments that osmotic tonicity is more jealously guarded than the volume of body-fluid; and this is borne out when we consider the characters of the regulatory processes which normally govern body-fluid. It is a fair generalisation that the body reacts quickly to stimuli which modify the tonicity of body-fluids, but more slowly to those which modify volume without change in tonicity; this is perhaps best shown by the very different response of a normally hydrated subject to water and to 0·9% salt solution. An increase in body-fluid tonicity stimulates both thirst (Wolf 1950) and the output of posterior-pituitary antidiuretic hormone (A.D.H.) (Verney 1947); a decrease in tonicity inhibits thirst and A.D.H. output. Both responses are rapid, and the excess water load is eliminated, or the deficit made good, within an hour or two. Neither response, at least in man, need involve any change in the solute content of the body. This close and rapid regulation of osmotic tonicity implies that changes in the volume of body-fluid shall be attended by corresponding changes in the total solutes of the body, except in so far as intracellular solutes may gain or lose osmotic effect, or have their osmotic action overborne by change in intensity of active shifts of electrolytes and water. For the present, we may be justified in accepting changes in sodium balance as representing changes in osmotically active solute. If we do this, we gain the impression that control of the volume of body-fluid is much less close and rapid than that of body tonicity. For one thing, expansion of the volume of body-fluid by saline provokes only a slow and incomplete diuretic response, unless the subject has been preconditioned by a water load, in which event he has a water rather than a saline diuresis (Ladd 1950). Moreover, on a diet of constant sodium content, and with minimal sweating, the sodium balance shows quite wide fluctuations, the equivalent of as much as a litre of body-fluid (Black and Thomson 1951). If one can assess the sensitivity of a regulating mechanism in terms of permitted percentage variation in the quantity regulated, it would appear that the regulation of tonicity, at least by the A.D.H. mechanism, is considerably more sensitive than the regulation of extracellular fluid volume, the phase of body-fluid most directly related to the sodium balance. The A.D.H. mechanism is sensitive to a change of about 1% in the tonicity of the blood supplying the hypothalamus (Verney 1948); whereas variations of the order of 6% of extracellular fluid, or 2% of body-fluid, are accepted, without immediate response, by the mechanism regulating volume.

It may not be altogether a coincidence that we know a good deal of the regulation of tonicity, whereas that of volume largely eludes us. A rapidly acting mechanism can be studied by short critical experiments, whereas a slowly acting mechanism, especially if it is bedevilled by diurnal variation (Stanbury and Thomson 1951), yields its secrets more reluctantly, and with greater chance of random error. I do not know if this is a valid reason, or merely an excuse, for the collective failure of natrophiles to expose a mechanism of regulation comparable in elegance to the A.D.H. mechanism; it may be that we still await our Verney. The essence of the problem clearly lies in the regulation of output of sodium and potassium in the urine; for there is no evidence of any intake regulation of these ions comparable to the thirst mechanism for water. I have lately reviewed the factors which determine sodium excretion (Black 1952), and shall now merely reiterate the conclusions that variation either in glomerular or in tubular activity may be critical under different conditions; and that the body possesses efficient mechanisms of sodium conservation, which is mainly effected by enhanced tubular reabsorption of sodium. We do not clearly know what change in body-fluid composition or distribution triggers off this mechanism, nor indeed anything of the way in which the message reaches the tubule cell. Adrenal hormones are known to increase sodium reabsorption in the renal tubule, but definite evidence of their participation in the normal response to a low-salt diet is still lacking. The regulation of potassium excretion has been reviewed in some detail by Berliner (1950); here again we are far from understanding the mechanisms involved. On a

low-potassium diet the body is capable of conserving potassium to a greater extent than has often been supposed (Fourman 1952); but potassium conservation sets in more slowly than that of sodium (Black and Milne 1952), although in the end the urine may contain potassium in lower concentration than the plasma.

Even this brief summary of body-fluid regulation must have brought out the central rôle of the kidneys, whose task it is to protect us from our dietary variations, privations, and indiscretions. In his Lumleian lectures last year, my chief, Prof. Robert Platt, was able to show how well the chronically diseased kidney can adapt itself to its straitened circumstances, and put up a good performance of homœostasis even when its excretory function is largely spent (Platt 1952). Unfortunately, even the normal kidneys can only continue their efficient regulation of body-fluid if the circulation through them is adequate, and if water is freely available for urine formation. Severe depletion of body-fluid withdraws the very conditions under which the kidneys function efficiently, and is to that extent self-perpetuating.

Body-fluid Depletion

In his Croonian lectures of 1946, Marriott performed a great service to medicine and surgery in elaborating the clinical distinction between water and salt depletion. My own preference is to speak of "sodium" rather than of "salt" depletion, in order to emphasise the importance of sodium in maintaining E.C.F. volume, and also to remind ourselves that the electrolyte lost in this condition is not sodium chloride but a mixture of chloride, bicarbonate, and other anions in varying proportions, depending on the particular channel of fluid loss. Although the term "salt depletion" is entirely adequate to express the important distinction which Marriott had in mind, it also suggests that salt solution, or "saline," is the correct replacement solution for E.C.F. depletion. Saline is certainly preferable to glucose solution in sodium depletion, but when large amounts of sodium have to be given —and I hope to show you later that this is often necessary —the use of saline will provoke acidosis, and a proportion of the sodium should be given in the form of bicarbonate or lactate. Van Slyke (1948) points out that "physiological" 0·9% saline is really unphysiological, as a substitute for E.C.F.

I have little to say of primary water depletion, except to emphasise the generalisation, implicit in Marriott's account, that water depletion arises from defective intake of fluid, whereas sodium depletion is mainly caused by abnormal losses of fluid. This generalisation really stems from the inevitability of water loss in sweat, urine, and expired air, in contrast to the effective conservation of sodium under all ordinary conditions. Like most clinical generalisations, it needs its proper glosses: as that in fever enhanced water loss may speed the depletion of water; and anorexia may aggravate the effects of sodium loss by enhancing the negative balance of sodium. But I think it holds true in respect of root causes.

My concern in the rest of these lectures will be with deficiencies of body-fluid which arise not from any lack of access to water—often indeed in spite of a free water intake, because of the compelling force of electrolyte depletion. Sodium depletion leads to shrinkage of the extracellular phase of body-fluid, and potassium depletion to shrinkage of the intracellular phase. Either deficiency may be complicated by change in the acid-base balance, and may even predispose to such change; but I shall discuss this as an incidental matter, even though in a few clinical contexts it may overshadow the change in total electrolyte. *Vitae summa brevis spem nos vetat inchoare longam*; and on this occasion life's own injunction to brevity is reinforced by the need to fit a large subject into little room.

Causes of Sodium Depletion

Dietary deficiency of sodium is not in itself a sufficient cause of serious sodium depletion, though it may aggravate depletion produced in other ways. Cation exchange resins are likewise ineffective in producing sodium depletion, for they do little more than prevent the absorption of dietary sodium; when cation exchange resin is added to a sodium-free diet, the excretion of sodium in the stools is not significantly increased (Mateer et al. 1951). Clinically significant sodium depletion arises only when loss of sodium from the body is abnormally great. In the tropics, and in mines and stoke-holds, the necessities of thermoregulation impose a loss of sodium in the sweat which may suffice to bring about either acute or chronic sodium depletion in otherwise fit people. In disease, sodium depletion arises either from external loss of gastro-intestinal secretions, or from increased urinary excretion of sodium. The various gastro-intestinal secretions contain about 1000 m.eq. of sodium per day, which represents about a third of the total sodium content of the body, and is five times as great as the average dietary intake of sodium. The stools normally contain less than 10 m.eq. of sodium per day; reabsorption of alimentary-tract sodium is carried out with an efficiency comparable to that of the renal tubule. Whenever appreciable amounts of gastro-intestinal secretions are lost to the body, the risk of sodium depletion arises; such losses may come from vomiting or diarrhœa, from fistulæ, or from continuous aspiration. No-one who has seen patients with cholera can doubt the effectiveness of this mechanism of sodium depletion, which can lead to circulatory collapse within a few hours; but fortunately the wastage of digestive juices is usually less extreme, and the syndrome of sodium depletion manifests itself more slowly. While gastro-intestinal disease is by far the commonest cause of clinical sodium depletion, urinary losses of sodium are not rare, and the channel of sodium loss is far less obvious than in the gastro-intestinal group. This occult quality of urinary sodium loss gives it diagnostic interest out of proportion to its absolute frequency.

Primary renal disease seldom leads to excessive sodium excretion. In most cases of renal failure, the decrease in glomerular filtration, and so in the amount of sodium presented to the tubules, is compensated by decreased sodium reabsorption (Platt 1950); the serum-sodium remains within normal limits until lowered by terminal vomiting or diarrhœa. Rare cases have been described in which renal disease has been associated with excessive sodium excretion—the "salt-losing nephritis" of Thorn et al. (1944). These may be distinguished from Addison's disease by their lack of response to deoxycortone. Apart from intrinsic renal disease, sodium may be lost to excess in the urine in Addison's disease, in osmotic diuresis, and in metabolic acidosis. Pitts (1952) presents a masterly discussion of the mechanisms by which adrenal deficiency enhances sodium excretion. In osmotic diuresis, the "loading solute," which may be either native (glucose) or foreign (mannitol) to the body, is excreted in large amount, and imposes a constraint on reabsorption by its osmotic activity; the urine volume rises, and also the rate of sodium excretion, though the concentration of sodium is diminished, unless sodium be itself one of the loading solutes, as in sodium sulphate diuresis. Clinically, osmotic diuresis contributes to sodium depletion in diabetic coma, with glucose as the loading solute (Brodsky et al. 1950). Urea may act as a loading solute in chronic renal failure (Platt 1951), and also in the water-and-salt diuresis which characterises the "early diuretic phase" of recovery from acute tubular necrosis (Bull et al. 1950). When excessive amounts of anions are produced in the body from any cause, such as increased breakdown of fat or protein, their excretion must be partly covered by base; initially this is largely sodium, but normally the

sodium loss is limited by increased renal formation of ammonia (Gamble et al. 1923). In renal disease and in Addison's disease (Jimenez-Diaz 1936), ammonia formation is impaired and acidosis may then lead to continued loss of sodium. Sodium excretion may also be increased deliberately by mercurial diuretics, and this may on occasion lead to a "low-salt syndrome" even in the presence of œdema (Schroeder 1949).

Abnormal Physiology

We have seen that sodium, with its associated anions, is the osmotic mainstay of extracellular fluid; and shrinkage of the extracellular fluid can account for the most significant features of sodium depletion. It is true that in severe sodium depletion the osmotic standard is relaxed somewhat, permitting a fall in the serum-sodium concentration; and this may account for some clinical manifestations such as cramp and lowered intestinal motility (Streeten 1950). It is also true that the impact of sodium depletion on the extracellular fluid phase could be modified by contributions of sodium from inside the cells and from bone; but I know of no studies showing that these collections of sodium can in fact function as sodium reserves, and at present we may justifiably look on sodium depletion as exerting its main effects by reducing extracellular fluid volume. Both plasma and tissue fluid are diminished in amount. Hypovolæmia with reduced cardiac output leads to inadequate circulation; reflex vasoconstriction may maintain the central blood-pressure for a time, but in severe sodium depletion the blood-pressure falls. The vasoconstriction varies in different circulatory areas, so that cerebral blood-flow is well maintained, but the splanchnic and renal blood-flow are reduced to an even greater extent than the cardiac output. Glomerular filtration is reduced, and nitrogen retention follows. The urine usually contains only traces of sodium and chloride; not only is the amount of sodium presented to the tubules lowered with the filtration-rate, but the tubules reabsorb sodium more completely. The depletion of tissue fluid is clinically obvious, but we know little of its effects on function; by modifying the internal environment unfavourably, it may contribute to the increased "wear and tear" of protein which was shown in McCance's experiment by increased urea production. This is speculation, and other causes for increased protein breakdown are just as likely—for example increased glucocorticoid production in response to stress, and dilution of intracellular fluid pari passu with the fall in plasma-sodium which commonly attends sodium depletion.

Clinical Features

The various manifestations of sodium depletion cannot be forced into a single clear-cut clinical syndrome, for they are profoundly modified not only by the primary disease but also by the concurrent state of water and acid-base balance and by the rapidity of onset and the magnitude of the sodium depletion. At the cost of some violence to the facts—perhaps no greater than is commonly offered in the separation of "disease entities" from the continuum of human morbidity—we may distinguish syndromes of acute sodium depletion, chronic mild sodium depletion, and chronic severe sodium depletion.

Acute sodium depletion arises when non-saline fluids are used to replace rapid losses of saline fluids, such as sweat or the exudate from burnt areas. It is seen when severe exertion is undertaken in the tropics, or in comparable artificial environments. Severe cramp is the outstanding symptom, and can be alleviated by ingestion or injection of salt. Under tropical conditions I have seen a "salt frost" on the skin, but the absolute loss of sodium in a few hours cannot equal the large losses of sodium sustained by patients with vomiting and diarrhœa, who often are free from cramp. It is well recognised clinically that high water intake potentiates the symptoms of acute sodium depletion, and it probably does so by entering the cells to produce a mild degree of water intoxication (Rowntree 1922).

Chronic mild sodium depletion, as judged by moderately lowered serum-sodium levels in the absence of clinical dehydration, is found in sufferers from "heat exhaustion" and from chronic wasting disease, notably tuberculosis. Ladell et al. (1944) described a syndrome observed towards the end of the hot season in the Persian Gulf, in which the patients suffered from loss of appetite and energy, and had low serum-sodium levels; but there was no clinical dehydration, and no signs of acute sodium depletion such as cramps and vomiting. They designated this syndrome "heat exhaustion, type II," in contrast to the other type of heat exhaustion observed by them in which the patients were obviously dehydrated. Both syndromes improved when salt supplements were added to the diet. Although low serum-sodium levels have likewise been noted in chronic illness, there is no similar evidence that the low serum-sodium is directly responsible for symptoms. Sims et al. (1950) suggest that the primary change may be a fall in intracellular osmolarity, and that the fall in serum-sodium represents an accommodation to this. There is no shrinkage of extracellular fluid volume, and no retention of sodium by the kidneys; addition of salt to the diet has little effect on the serum-sodium level or general clinical state.

Chronic severe sodium depletion is what is generally referred to, not altogether happily, as "dehydration." The term dehydration can be criticised on the grounds of ambiguity, and because it emphasises *water* depletion; whereas clinical dehydration is most commonly related to primary sodium depletion, the loss of water being secondary to this. Our clinical judgment of the hydration of the body is based largely on inspection and palpation of the subcutaneous tissue, whose fullness and elasticity depend on its content of extracellular fluid. A primary water depletion is spread over both intracellular and extracellular fluid, whereas sodium depletion has its impact on the extracellular fluid alone; the impression of dehydration from a given degree of sodium depletion will thus be greater than that from a comparable depletion of water itself. In spite of these semantic objections, the term "dehydration" does convey a familiar clinical picture, which I maintain is that of severe sodium depletion. Its features have often been described, and are well recognised. I do not propose to conduct you once again over this well-trodden road, but rather to bring forward evidence that the magnitude of the sodium depletion which underlies clinical dehydration has often been underestimated, and in consequence sodium replacement has been inadequate. I shall first consider the methods at our disposal for assessing sodium depletion.

Assessment of Sodium Depletion

We may distinguish between prospective and retrospective methods of assessing the depletion of sodium, or indeed of other bodily constituents. The prospective method, in which we measure the negative balance of sodium as it accumulates, is obviously only applicable in experimental studies, in which we can assume a normal initial sodium-household, and can observe the induced distortion from its beginning. The errors of this method are limited to those inherent in balance technique. Retrospective assessment of depletion involves the measurement of the positive balance of sodium, or other substance, which accomplishes repair of the depletion. The validity of this method depends on the assumption that a normal state has in fact been reached at the conclusion of the observations, an assumption which may not hold where repair of a depletion has been accelerated by giving supplements of the defective material. For

example, McCance (1936b) describes one subject who lost 17·5 g. of sodium during depletion, but retained 21 g. during recovery; there was a gain in weight equal to the gain in extracellular fluid volume which would correspond to the observed increase in sodium content of the body at the end of the experiment. Again, Atchley et al. (1933) give figures showing discrepancy between loss of sodium and subsequent gain in diabetics allowed to enter acidosis and then recover.

Neither of these rather direct methods can give a practical clinical assessment of sodium depletion, for the data required for a prospective assessment are lost in the past, while the retrospective assessment would be available only when the depletion had been corrected. We are left with indirect methods, which include isotope dilution, the estimation of the serum-sodium level, and the more purely clinical assessment of dehydration and sodium loss. With isotope dilution methods, it is possible to make a fairly accurate assessment of the exchangeable sodium content of the body; but to convert this to an assessment of the depletion, it is necessary to compare this with a normal value, and here we encounter the wide range of normal variation. Nevertheless, observations on the exchangeable sodium content in clinical dehydration, supplemented by observations on the same patient after recovery, would form a useful addition to our quantitative knowledge of clinical sodium depletion. Without this background of information, the isotope method is of no present value in the clinical assessment of sodium depletion; but in five years our hunger for numerical precision may make it seem indispensable.

The clinical assessment of sodium depletion is an exercise in which no merit attaches to dissociating the evidence derived from history, examination, and chemical analysis. None of these, and perhaps least of all the chemical analysis, gives us by itself all the information which we require for considered treatment. The history should establish the channel of sodium loss, and give us at least an indication of its amount. In the great majority of these patients, sodium has been lost from the alimentary tract in an obvious way; renal loss of sodium is infrequent by comparison, and diabetes or Addison's disease have usually been recognised before the onset of dehydration. Physical examination shows the presence of dehydration and of peripheral circulatory failure; and in conjunction with the history allows some estimate of the amount of sodium depletion. By the time dehydration is just detectable clinically, there must already be a considerable sodium deficit; this may be of the order of 200 m.eq., corresponding to 1·5 litres of extracellular fluid, for Atchley et al. (1933) found such a sodium deficit in diabetics who were allowed to become acidotic but were not notably dehydrated. In acute sodium depletion with definite dehydration, as in diabetic coma, the sodium deficit is probably around 400–500 m.eq.; at any rate, Nabarro et al. (1952a) found that the retention of sodium in such patients during recovery ranged from 273 to 571 m.eq., with a mean of 455 m.eq. Much larger amounts of sodium may be lost in chronic dehydration, the result of long-continued loss of gastro-intestinal fluids. I have lately seen a patient who had been losing bile and pancreatic secretion for some weeks from a duodenal fistula. He was severely dehydrated, with cord-like veins and eyes staring from lid retraction; the serum-sodium was 118 m.eq. per litre. He was given no less than 1400 m.eq. of sodium in one protracted infusion. He was much better, with full veins and no appearance of exophthalmos, but his serum-sodium was still below normal, and his deficit had presumably not been fully corrected.

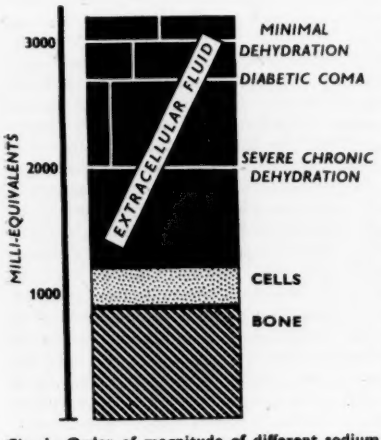

Fig. 1—Order of magnitude of different sodium deficits in relation to the normal distribution of sodium.

Given historical evidence of sodium loss, and clinical evidence of dehydration, we can get further help from chemical analysis of the blood in assessing the amount of the sodium deficit. It may be very difficult to get blood from a superficial vein, and on one or two occasions I have had to withdraw blood from the femoral vein. With a flame photometer, sodium and potassium concentrations can be estimated on 1 ml. of serum; but whenever possible the chloride and bicarbonate should also be estimated, the whole sample being taken under liquid paraffin. A raised blood-urea, hæmatocrit, or plasma-protein level is often found in dehydrated patients, but in guiding treatment they are less important than knowledge of the electrolyte concentrations.

Treatment of Severe Sodium Depletion

No special difficulty arises in the treatment of acute sodium depletion, where the sodium deficit is of the order of 500 m.eq., an amount which can be restored by giving 3 litres or so of "normal" saline. If the first litre of normal saline is given quite rapidly, say in an hour, the circulation to the kidneys is sufficiently restored in moderate sodium depletion to enable them to act selectively, excreting a higher proportion of the chloride than of the sodium. We may observe in passing that such is the normal kidney's daily task—to conserve bicarbonate in the body-fluids although our sodium intake in the diet is almost wholly in combination with chloride. It is generally accepted that amounts of sodium chloride of this order can be given without producing significant acidosis (Peters and Van Slyke 1931). When sodium depletion is already complicated by metabolic acidosis, as in diabetic coma, it is better to give one litre in three of the replacement fluid as $M/6$ sodium lactate instead of as $M/6$ sodium chloride, or "normal saline."

Chronic severe sodium depletion presents a more difficult problem in several ways—the large amount of sodium needed, the acidifying effect of really large sodium chloride infusions, the frequent co-existence of potassium depletion which may be intensified by massive sodium infusion. I shall devote the rest of this lecture to the management of this type of sodium depletion, which is almost always associated with severe and prolonged loss of gastric, pancreatic, or intestinal secretion. This is a syndrome where proper treatment should bring physician and surgeon together. The physician can often restore electrolyte balance, but is powerless to arrest the continuing fluid loss; on the other hand, the surgeon, unless he be very exceptional, may make more mistakes than the physician in trying to make this type of patient "safe for surgery."

Before advocating special measures of treatment for these patients with severe sodium deficiency, I must first try to establish that their sodium deficit is in fact 1000 m.eq. and upwards—half or more of the normal extracellular sodium content of the body. The channel of sodium loss is certainly adequate to account for deficits of this magnitude; with the exception of gastric juice, the various alimentary secretions are equivalent in sodium content to extracellular fluid, and losses of 8–9 litres of

these fluids in a few days are not uncommon in severe diarrhœa, paralytic ileus, and postgastrectomy duodenal fistulæ. Coller et al. (1938) measured the loss of "salt" in various patients with lesions of the upper gastro-intestinal tract. In one patient the measured loss amounted to 79·8 g., representing 1360 m.eq. If in fact it was chloride which was measured, this would be an overestimate of the sodium loss; but the article does not indicate that this was so. Similar losses of sodium can occur in patients with watery diarrhœa; in one patient with steatorrhœa the fæcal loss of sodium over twelve days amounted to 1127 m.eq. Evidence of the large size of sodium deficit can also be gained from the amount of sodium which can be given in repair of the deficit. I have already quoted a man who received 1400 m.eq. of sodium by infusion without becoming clinically or biochemically "over-salted." Another patient with protracted vomiting was given 1700 m.eq. of sodium in a single infusion, without ill effect, and with a fall in his blood-urea from 152 mg. per 100 ml. to 38 mg.

An indirect estimate of the sodium deficit can also be gained from the serum-sodium level, and this is of special practical value in that it can be made before treatment is begun. I would remind you that in experimental sodium depletion the level of serum-sodium is conserved for a time, and then falls when the sodium deficit becomes considerable. This fall in serum-sodium is attended by the entry of water into the cells, as was demonstrated in the animal experiments of Darrow and Yannett (1935). It might be supposed that, since sodium in the body is largely confined to the extracellular fluid, the sodium deficit could be arrived at by multiplying the fall in serum-sodium by the extracellular fluid volume. In fact, however, we must use the total body-water in our estimate, and not the E.C.F. volume; the shift of water into cells maintains the E.C.F. sodium concentration at a level which does not directly reflect the loss of sodium from E.C.F. For example, a patient who has lost half his E.C.F. sodium might be expected to have a fall in serum-sodium of 70 m.eq. per litre, but the observed fall in serum-sodium is only about a third of this, since there is about twice as much intracellular as extracellular fluid. This can be expressed in another way, perhaps more directly relevant to treatment, by saying that the effective volume of distribution of injected sodium approximates the total body-water rather than the extracellular fluid. In support of this contention, I have calculated the "volume of distribution" of sodium injected as hypertonic saline, using some of our own results (Black, Platt, and Stanbury 1950), and additional data provided by Dr. S. Oleesky (personal communication). When the total amount of injected sodium is divided by the observed rise in serum-sodium, we have the effective volume of distribution of sodium. In 11 subjects, this averaged 54·7 litres, with 99% confidence limits of 33·6–75·8 litres. This is not of course a practical method of measuring total body-water, for the error of the difference between two serum-sodium levels is high; but my point is that the average figure approximates the total body-water, and is significantly different from any possible value for extracellular fluid volume.

Entry of water into the cells is not the only factor which keeps the serum-sodium at a higher level than would correspond exactly to the sodium deficit; there is also the loss of water which inevitably attends the depletion of sodium. This is very variable from one patient to another, for although sodium is usually lost in isotonic solution, the amount of water which the patient is willing or able to drink varies. The concurrent water loss will tend to minimise the fall in serum-sodium, which therefore gives a conservative estimate of the sodium deficit. In the extreme case the serum-sodium may be within normal limits, or even raised, as reported by Allott (1939), by Borst (1938), and more recently by Higgins et al. (1951). The conjunction of raised serum-sodium and low sodium output is often associated with brain disease or injury, in which water intake is prevented; it is distinctly unusual in the severe sodium depletion which we are discussing. When present, it is not a contra-indication to saline therapy, if the history clearly indicates salt loss, and the patient is dehydrated. Conversely, a low serum-sodium should never be the sole indication for saline therapy; we have already mentioned the hyponatræmia of chronic disease, which is not associated with overt salt loss or dehydration, and does not respond to saline therapy, nor indeed require it.

When the clinical evidence of sodium depletion is secure, the serum-sodium can be used to assess the sodium deficit; it tends on the whole to underestimate it, because of concurrent water loss. The observed serum-sodium in m.eq. per litre is subtracted from 140 to give the "serum-sodium deficit," which gives the amount of sodium deficit per litre of body-water. The average value of 40 litres for total body-water can be used to calculate the total deficit in milli-equivalents. This is then divided by 140 to give the number of litres of isotonic solution needed to repair the deficit. If [Na] is the serum-sodium level the isotonic fluid needed is given by

$$\frac{(140-[\mathrm{Na}])\times 40}{140}.$$

Even this simple formula is too precise, and it is sufficient to take a third of the "serum-sodium deficit" as our measure of the requirement of isotonic sodium solution in litres. No-one who has noted the successive approximations by which this figure is derived will be tempted to regard it as other than a crude measure of the saline requirement; but even as such it has proved itself in my experience to be of some value. For reasons which I have given, it underestimates the saline requirement, and at the completion of infusion the serum-sodium is usually at the lower limit of normal. Although the amount of saline prescribed in this way may be large, I have not seen any evidence of salt overloading when this formula has been used. Others have advocated the serum-chloride level or the specific gravity of the plasma as guides to infusion: but the serum-chloride level is invalidated, as a measure of sodium depletion, by acid-base disturbances; and the plasma-protein level may be quite misleading in debilitated patients (Abbott 1946).

It should be noted that any such assessment can give us information only on the sodium deficit; in addition to making up the deficit, we must repair continuing losses of salt as they occur, and also cover the patient's maintenance requirement of water. When possible, the best way of dealing with continuing losses of saline fluid is to return it to the patient by stomach-tube, as is done in the Hammersmith régime for anuria (Bull, Joekes, and Lowe 1949), and as can sometimes be done with the secretion from fistulæ. When the fluid cannot be returned in this way, because of its nature (e.g., watery stools) or because of alimentary dysfunction (ileus or obstruction), a fluid of similar composition and amount should be given parenterally. When the fluid loss is small, and the kidneys are healthy and well supplied with blood, volume-for-volume replacement with normal saline may be adequate. When large amounts of fluid are involved, better results are obtained by using a replacement fluid with an acidifying or alkalinising effect similar to that of the fluid lost. Short of the perfectionism of analysing the fluid, and providing a tailor-made substitute, this can be done by giving a proportion of lactate, or of ammonium chloride, in the infusion fluid. Cooke and Crowley (1952) have made a useful practical approach to this problem by devising solutions suitable for replacing

loss of gastric fluid, and of intestinal fluid respectively; these can be kept in readiness, and this avoids the delays inherent in a perpetual ad-hoc approach. The maintenance requirements of patients who cannot take food and water by mouth have been reviewed in some detail by Gamble (1951); he recommends 2 litres of 5% glucose daily to cover water losses, and to exploit the protein-sparing effect of carbohydrate. In patients who can eat and drink, thirst is the best guide to their maintenance water requirement.

These severely dehydrated patients whom we are discussing often have a sodium deficit equivalent to 10 litres or more of normal saline. When we add to this the replacement of current loss and the maintenance of water intake, it will be seen that the fluid requirement may be very high, the volume to be infused amounting to perhaps 12 litres of normal saline and 2 litres of glucose. I have suggested elsewhere (Black 1951) one expedient whereby the intravenous traffic can be kept down to a reasonable level—we may be content to allow several days for the correction of the existing deficit. Further experience has convinced me that this method may suffice for patients with moderate dehydration, but that severely dehydrated patients need more vigorous treatment, and it is specially important to restore the renal circulation as soon as possible. The large amounts of salt needed cannot be given by mouth in time, and similarly subcutaneous saline with hyaluronidase would not seem to offer sufficiently rapid replacement, in adults at least. Large amounts of hypertonic saline can be given to normal people without obvious harm; and I have also given considerable amounts of hypertonic saline to patients with anuria, who often have a low serum-sodium, and in whom it is desirable to keep fluid intake low. I believe there is a place for hypertonic saline infusion in patients with a large and definitely established sodium deficit, a low serum-sodium, and no condition which interferes with oral water intake. Such patients are not common, but I have treated 4 in the past year with 5% saline and molar lactate in amounts ranging from 500 ml. to 2 litres. In all of them the clinical improvement was definite, and there were no untoward effects. In 3 of them, I have observations comparing the amount of water actually drunk with that required to dilute the hypertonic sodium solutions down to isotonicity. Table I shows that the

TABLE I—APPARENT "WATER FROM CELLS" IN PATIENTS GIVEN HYPERTONIC SALINE

Patient	Volume of hypertonic infusion (ml.)	Theoretical "water of dilution" (ml.)	Excess of water drunk (ml.)	"Water from cells" (ml.)
1	350	1400	600	800
2	1600	6400	5000	1400
3	2000	8000	2800	5200

positive water balance, even neglecting insensible losses, was considerably less than the water needed to dilute down the hypertonic infusion; this would indicate that under such circumstances substantial amounts of water are available from the cells. In patient 3, infusion of the same amount of sodium as normal saline would have meant loading the patient with several litres of extra water, and his intracellular plethora would not have been so promptly relieved. Although the indications which I have given for hypertonic saline are limited, the results in suitable patients can be dramatic.

When these large amounts of sodium have to be given, whether in isotonic or hypertonic solution, attention must be given to acid-base regulation and to potassium depletion. Large amounts of sodium chloride infusion lead to lowering of the plasma-bicarbonate, and this "dilution acidosis" (Shires and Holman 1948) may be clinically important when the renal defence of extracellular fluid pH is impaired. When there is no pre-existing acidosis or alkalosis, a fifth of the sodium in large infusions should be given as lactate, either undiluted molar sodium lactate, or diluted to one-sixth molar concentration. The proportion of lactate to chloride is appropriately modified when there is already a distortion of the acid-base balance. Many of the causes which lead to massive sodium depletion also lead to significant potassium depletion, but this may not be apparent either clinically or biochemically so long as the extracellular fluid volume is contracted by sodium depletion. As sodium depletion is corrected, the serum-potassium falls, partly because potassium excretion is increased during saline infusion (Wolf 1947) and partly because of expansion of E.C.F. volume. In 1 patient, the serum-potassium fell from 5·6 to 2·8 m.eq. per litre in twenty-four hours, during which a massive saline infusion had been given. My own practice is to give potassium salts by mouth during repair of massive sodium depletion; when this is not possible, parenteral potassium may be justified—a matter to be discussed in the second lecture.

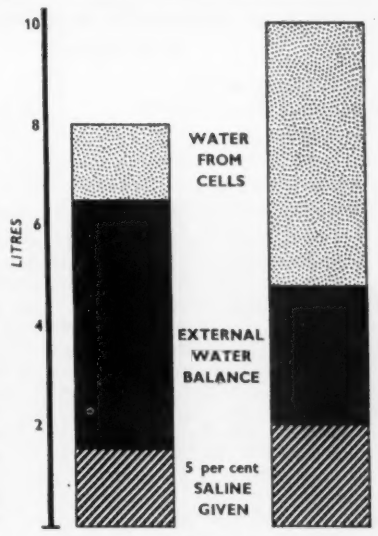

Fig. 2—Comparison of water theoretically required to dilute hypertonic saline down to "normality" with the actual positive balance of water in two patients. The difference represents water mobilised from cells during hypertonic saline infusion.

Perhaps this is as convenient a place as any to point the moral that depletion of sodium, potassium, and water are closely related to each other, and to the acid-base balance, although for purposes both of experiment and of discussion we may sometimes find ourselves forced to impose on them a spurious isolation. When we speak of "sodium depletion," I think we really imply "primary" or "predominant" sodium depletion, for secondary effects very quickly follow any loss of electrolyte or water from the body. Much of the interest of experimental studies in which a specific electrolyte depletion is induced lies in observing the secondary effects on other electrolytes and on water—a theme which I hope to develop in the second lecture. In clinical work, we have the additional complication that most depletions are mixed from their very onset, and we may be hard put to it to discover which changes are primary, and which represent secondary effects. As in most other fields of medicine, responsible experience of the clinical problems creates a healthy distrust of the corpus of knowledge and the intellectual equipment with which we presume to solve them.

"Man is the result of two thousand million years of biological evolution; he has every prospect of an equal or even greater span of psycho-social evolution before him. The human species has many grave problems before it: but it has a great deal of time in which to work them out—there may be some comfort in that thought."—JULIAN HUXLEY, F.R.S., Evolution in Action. London, 1953; p. 135.

D.D.D. THERAPY IN CUSHING'S SYNDROME

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D.D.D. has the formula 2,2 bis-(parachlorophenyl)-1, 1-dichloroethane, and is an insecticide related to D.D.T. In 1948 and 1949 Nelson and Woodard reported the important discovery that, when dogs are given this substance by mouth in a dosage of about 20–50 mg. per kg. body-weight, the deeper layers of the adrenal cortex atrophy and disappear. Within about a month, only the zona glomerulosa and a narrow outer part of the zona fasciculata remain. Nichols and Gardner (1951) confirmed these findings and found that the dogs became relatively insulin-sensitive, though there was no disturbance of electrolyte balance. Nichols and Sheehan (1952) described the development of the histological changes in the adrenal cortex, and studied the related disturbances of carbohydrate metabolism. They found that such dogs could not be made diabetic with alloxan, but remained resistant to potassium intoxication.

Such a striking and very specific destruction of the deep layers of the adrenal cortex raised the possibility that D.D.D. might have considerable therapeutic value in patients whose symptoms indicate a hyperfunction of these layers—e.g., adrenal virilism or Cushing's syndrome, and possibly some cases of diabetes or hypertension. The difficulty was that dogs are the only laboratory animals known to develop the adrenal lesion as a result of treatment with D.D.D. This substance had not previously been given to man, and thus there was no information as to whether it had any effect on the human adrenal. The investigation to be described shows that, with the particular dosage used, D.D.D. does not produce any significant clinical effect on Cushing's syndrome, and that at any rate it does not cause any permanent adrenal atrophy in this condition. Nevertheless it is to be hoped that the investigation of chemically related substances will lead to the development of a method of reproducing in these patients the same degree of atrophy and reduction of function of the adrenal cortex as can be obtained in the dog.

TABLE I—MEAN FIGURES OF GLUCOSE-TOLERANCE AND INSULIN-TOLERANCE TESTS BEFORE D.D.D. THERAPY

Test	Minutes				
	0	30	60	90	120
Glucose-tolerance (mg. per 100 ml.)	83	161	172	149	102
Insulin-tolerance (mg. per 100 ml.)	86	70	72	80	71

The patient treated in the present study was made fully aware of the experimental nature of the treatment, of the possible beneficial effects, and of the completely unknown risks. We should like to record our thanks for her willing coöperation.

INVESTIGATION

The patient married at the age of 20. She had no pregnancies, and menstruation continued regularly. Her weight remained at its normal level of 109 lb., her height being 62½ inches. Apart from a short attack of hepatitis when she was 23, her health was good until the onset of the endocrine disturbance. At the age of 24 menstruation ceased and she gradually developed a classical and severe Cushing's syndrome during the next two years. She was admitted to hospital when she was 27, complaining of a rapid increase of weight, change in facial appearance, lack of energy, occasional headaches, and sometimes slight swelling of the feet.

On examination she had the characteristic red "moon face," with moderate growth of hair along the side of the jaw and a little over the chin; considerable obesity, mainly of the trunk; purple striæ on the sides of the abdomen; and a buffalo-hump over the shoulders (see figure). Her weight was 154 lb. There was mild acne of the face and trunk. The pubic hair was of masculine distribution. The clitoris was not enlarged. The uterus was small and the endometrium atrophic. Radiologically the skull appeared normal and there was no decalcification of the spine or long bones; the left kidney had a double pelvis and ureters. The blood-pressure ranged between 200/135 and 185/120 mm. Hg. The electrocardiogram was normal, apart from a negative T_3.

Several blood-counts gave mean figures as follows: Hb 107%; red cells 5,500,000 per c.cm.; and white cells 9800 per c.mm. Kepler tests showed good diuresis, with a urine output in the 2nd hour more than double the volume of the night urine; the Kepler index ranged from 56 to 116. The basal metabolic rate (B.M.R.) was −16% and −21%. There was a moderate increase of nitrogen excretion in the urine, and the urinary excretion of 17-ketosteroids and 11-oxycorticoids was above normal. (These and other biochemical findings are shown in table III.) The patient was relatively resistant to insulin. The mean figures of two glucose-tolerance tests after a dose of 50 g. of glucose by mouth, and of three insulin-tolerance tests after an intravenous injection of 7·5 units of insulin, are shown in table I.

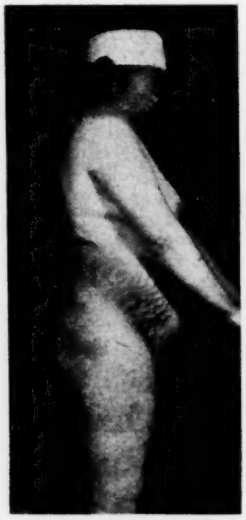
TABLE II—MEAN FIGURES OF GLUCOSE-TOLERANCE AND INSULIN-TOLERANCE TESTS AFTER COMPLETION OF SECOND COURSE OF D.D.D.

Test	Minutes				
	0	30	60	90	120
Glucose-tolerance (mg. per 100 ml.)	117	200	202	184	126
Insulin-tolerance (mg. per 100 ml.)	175	122	160	160	150

Treatment

The patient was studied for an observation period of 12 weeks before the administration of D.D.D. was begun. Her weight gradually increased to 168 lb.

The first course of treatment with D.D.D. lasted 18 days. The dosage was 1·06 g. daily, equal to 13·3 mg. per kg. body-weight; the total amount given in this course was 19 g., administered by mouth as a 10% solution in oil of arachis. There was no recognisable clinical effect. The blood-pressure continued in the range of 210/120 to 190/110, and the weight increased to 176 lb. The only biochemical change was a fall in the serum-sodium level. Glucose-tolerance tests and insulin-tolerance tests gave curves substantially the same as before treatment.



The patient at the age of 27, showing the striæ on flanks and abdomen.

An observation period of 39 days followed, in case delayed effects of D.D.D. might appear. No such effects were seen. The blood-pressure ranged from 200/120 to 180/120. The patient was next given a second course of treatment, which lasted for 30 days. The dosage was 2·84 g. daily, equal to 34·6 mg. per kg.; the total amount in this course was 85 g. The drug was again given dissolved in oil of arachis. No clinical effects were observed, apart from the fact that the blood-pressure was

TABLE III—URINE AND BLOOD BIOCHEMISTRY

	Period					
	From March 1, 1951, to June 20, 1951	From June 21, 1951, to July 8, 1951	From July 9, 1951, to Aug. 14, 1951	From Aug. 15, 1951, to Sept. 15, 1951	From Sept. 16, 1951, to Nov. 26, 1951	From Nov. 27, 1951, to Dec. 6, 1951
	Observation	D.D.D.	Observation	D.D.D.	Observation	D.D.D.
Daily urinary excretion:						
Urine vol. (ml.)	2000	2160	2130	2210	2100	1860
Urea (g.)	23·1	27·2	31·2	27·8	24·4	18·0
Uric acid (g.)	0·75	0·86	0·79	0·80	0·87	0·83
Creatinine (g.)	0·98	0·76	0·91	0·82	1·31	1·55
17-Ketosteroids (mg.)	15·0	17·8	14·3	9·6	11·8	13·3
11-Oxycorticoids (mg.)	1·6	2·6	2·3	2·7	1·9	4·5
Blood:						
Potassium (mg. per 100 ml.)	20·0	20·5	20·0	19·5	..	..
Sodium " "	311	280	293	253	295	329
Cholesterol " "	134	111	76	117	186	128
Urea " "	29	28	35	31	37	22

always a little lower, in the range of 180/110 to 170/120. Her weight was 182 lb. Biochemically there was again a fall in the serum-sodium level, and there was a slight reduction in the urinary excretion of 17-ketosteroids.

A further period of observation was allowed, lasting for 72 days. During this time the blood-pressure varied between 195/135 and 180/110, and the weight increased to 190 lb. The B.M.R. was −1%. Glycosuria never occurred, but there appeared to be some deterioration of her carbohydrate control mechanism. The mean figures of glucose-tolerance tests and insulin-tolerance tests at this stage are shown in table II. On the 50th day of this observation period a sample of subcutaneous abdominal fat was removed for chemical assay of its D.D.D. content. The wound did not heal for about a month, the delay being presumably due to the high production of endogenous cortisone.

TABLE IV—D.D.D. CONTENT OF TISSUES

Tissue	Date	D.D.D. (mg. per 100 g.)	
		On lipid	On whole tissue
Adipose tissue	Nov. 1, 1951	41	35
"	Feb. 20, 1952	18	14
Adrenal gland	"	22	5

For the third course of treatment D.D.D. was given as a 10% solution in olive oil, because arachis oil could not be obtained. The dosage was raised to 5·68 g. of D.D.D. a day, equal to 63·1 mg. per kg. On the 2nd day of treatment she was drowsy. On the 3rd day she was very sleepy and greatly depressed. She complained of headache, giddiness, and nausea, and vomited once. In view of these toxic symptoms the medicine was changed for an equal amount of olive oil containing no D.D.D.; the patient was not told that the active drug had been discontinued. She improved rapidly and was in her normal condition within 2 days. On the 3rd day of this rest period the same volume of a 2·5% solution of D.D.D. in olive oil was substituted for the pure olive oil, the patient thus being given only 1·42 g. of D.D.D. a day, equal to 15·8 mg. per kg. There was a rapid recurrence of the same symptoms as had occurred with the larger dosage. The treatment was continued for 4 days, a total of 23 g. being given in this course. Then, as the toxic effects were continuing, all therapy was abandoned. The patient again recovered to her normal state within 2 days.

After D.D.D. therapy had been discontinued her clinical condition remained unchanged apart from a further increase of weight to 197 lb. On the 76th day after stopping the treatment, nine-tenths of the left adrenal gland was removed by Mr. Philip Hawe. The gland appeared of normal size. Histologically it did not show any atrophy of the deeper layers of the cortex, or any changes suggesting regeneration after previous atrophy. There was no cellular infiltration. Small groups of cortical cells were present in places in the medulla, as is commonly seen in glands from normal people. Part of the adrenal and a sample of subcutaneous fat from the operation incision were collected for chemical assay. Healing of this wound was again slow, taking about 2 months.

After this operation she was given a reducing diet, and after 7 months her weight was 163 lb. At this time her face and abdominal striæ were slightly less red, but the operation wounds were still very red. Her blood-pressure remained in the range of 190/135 to 220/145. A blood-count was normal. The daily urinary excretion of 17-ketosteroids averaged 16·6 mg. The results of a glucose-tolerance test were as follows:

Minutes	0	30	60	90	120
Mg. per 100 ml.	114	183	210	211	143

Slight glycosuria occurred at 90 minutes. The Kepler test showed a good diuresis. The only abnormal finding in the blood chemistry was a high serum-sodium level of 385 mg. per 100 ml.

Biochemical Observations

24-hour specimens of urine were analysed three times a week during the administration of D.D.D. and once or twice a week during the observation periods. We are indebted to Mr. E. Caldecott and Mr. G. Appleton for these laborious estimations.

The technique used for the 11-oxycorticoid estimations was the formaldehyde-chromotropic acid method of Daughaday et al. (1948). This method probably does not measure more than a small fraction of the total 11-oxycorticoids, but the results are sufficiently reproducible for comparative studies of the present type. In this laboratory normal persons give by this method a urinary excretion of 0·3–0·7 mg. per day.

The mean figures of 69 urine estimations and 27 blood estimations are shown in table III. It will be seen that the high output of urine, of nitrogenous excretion products, and of 17-ketosteroids and 11-oxycorticoids was not significantly altered by the treatment. There was no fall in the serum-sodium level during the third period of treatment, possibly because the course lasted only a short time.

Tissue Chemistry

The D.D.D. content of the pieces of tissue was assayed by Dr. F. D. Collins and Mr. G. A. J. Pitt, of the biochemistry department, Liverpool University. Their report is as follows:

"The lipid extracted with ether from the specimens was nitrated, and the colour was developed with sodium methoxide in methanol-benzene mixture according to the procedure of Ofner and Calvery (1945). The intensity of absorption at 600 μ was measured in a photo-electric spectrophotometer and compared with that of D.D.D. which had been similarly treated. Samples of normal human fat, and of the pentothal and curare used at the operation, were examined as controls, with negative results. The findings in the tissues from the patient are given in table IV.

"These tissues contain in addition to the D.D.D. an interfering substance which has a maximum absorption at 500 μ and may be derived from a metabolite of D.D.D. (It is not, however, the same as that mentioned by Ofner and Calvery (1945), which has a maximum at 540 μ.) This has required a correction of the observed absorption at 600 μ; the amount of this correction cannot be assessed with absolute accuracy.

In our opinion the true values are very close to the figures given, though they might be a little lower. Assuming the maximum errors both in the estimations and the correction, the true values cannot possibly be less than half the figures given."

DISCUSSION

This experimental therapy was undoubtedly a complete failure from the clinical aspect. The biochemical findings during the second course of D.D.D. treatment raised the slight possibility that there might at that stage have been some increased adrenal production of deoxycorticoid-like substances and a decreased production of androgens. Histologically there was, however, no evidence that the adrenal cortex had been affected in any way by the treatment.

The problem arises of why, in man, D.D.D. does not produce atrophy and loss of function of the deeper zones of the adrenal cortex.

In the dog D.D.D. certainly accumulates in the adrenal cortex as well as in the adipose tissue. It is not known whether D.D.D. produces its effect on the dog's adrenal by direct toxic action in the gland or whether it blocks the action (or the production) of corticotrophic hormone. Nevertheless it is clearly important to know whether D.D.D. is accumulated in the adrenal gland and adipose tissue of man in the same way as it is in the dog.

Before the onset of her illness the patient weighed 50 kg. and was of normal nutrition; she would have a normal amount (say about 5 kg.) of adipose tissue distributed in her body. If it is assumed that her subsequent increase of weight was nearly all due to fat, she presumably had about 45 kg. of adipose tissue when the specimens of tissue were obtained for analysis. Thus it may be calculated that there was a total of 16 g. of D.D.D. in the adipose tissue of the body at the time of the first biopsy (7 weeks after she had taken 104 g.), and 6 g. at the time of the second biopsy (11 weeks after receiving a further 23 g.).

To compare the results of animal experiments with the present case, the figures may be considered in terms of the amount of D.D.D. per 100 g. of fat. Finnegan et al. (1949) gave D.D.D. orally to dogs in a dosage of 25 mg. per kg. for four weeks. Immediately at the end of this period the dogs had 30–88 mg. of D.D.D. per 100 g. of fat. If the dosage had been 35 mg. per kg., it may be inferred that the dogs would have had 40–120 mg. of D.D.D. per 100 g. of fat at that time. These workers have shown that D.D.D is slowly broken down; some of the metabolic products may remain for a time in the fat, but others are excreted in the fæces and urine. Thus, after the administration of the drug is discontinued, there is a progressive and gradual reduction in the amount of D.D.D. in the fat.

The present patient was given 35 mg. of D.D.D. per kg. for 4 weeks. The immediate concentration in the fat is not known, but after an interval of 7 weeks there still remained 35 mg. of D.D.D. per 100 g. of fat. During the last course of treatment she was given about a quarter of the amount given in the second course. After a further interval of 11 weeks, there was 14 mg. of D.D.D. per 100 g. of fat. These findings suggest that in man the initial accumulation of D.D.D. in the fat had probably been roughly about the same as in the dog, and that the lower figures when the biopsy specimens were taken resulted from the gradual metabolism of the D.D.D. in the fat.

Finnegan et al. found that the adrenals of the dog contained 0–21 mg. of D.D.D. per 100 g. of tissue when the fat contained 30–88 mg. of D.D.D. per 100 g. In the present patient the amount of D.D.D. per 100 g. of adrenal tissue was about a third of that per 100 g. of fat. There is therefore nothing to indicate any important difference between the rate of accumulation of D.D.D. in the adrenal of man and the dog.

The absence of any significant effect on the adrenals of the present patient is thus not apparently related to any failure to accumulate D.D.D. in the adrenal glands. It must be considered as due to some lack of sensitivity of the human adrenal to D.D.D.; the precise cause of this remains to be ascertained.

It is of interest that the toxic symptoms occurred when the D.D.D. was given in olive oil, but not when it was given in oil of arachis. Possibly there may have been some interaction with the oil, or some difference in the rate of absorption. This needs to be considered in further work on the subject.

SUMMARY

D.D.D. is a substance which, when given experimentally to dogs, produces severe atrophy and loss of function of the deeper layers of the adrenal cortex.

An attempt was made to reproduce this adrenal atrophy for therapeutic purposes in a patient with Cushing's syndrome. She was given a total dosage of 127 g. of D.D.D. in three courses of treatment.

No recognisable clinical, biochemical, or histological response was obtained.

Biopsies of fat and of adrenal gland showed that D.D.D. was taken up by these tissues in the human patient in amounts comparable to those in the dog. The insensitivity of the human adrenal gland to D.D.D. thus does not appear to be due to any failure of the substance to accumulate there.

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ISONIAZID-RESISTANT STRAINS OF TUBERCLE BACILLI

THEIR DEVELOPMENT AND STABILITY

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STRAINS of *Mycobacterium tuberculosis* resistant to isonicotinic acid hydrazide (isoniazid) have been produced in vitro (Steenken et al. 1952, Buck and Schnitzer 1952, Pansy et al. 1952, Middlebrook 1952, Hobby and Lenert 1952, Rist et al. 1952, Goulding et al. 1952), and they occur frequently in the sputa of patients treated with the drug (Medical Research Council 1952).

During experiments in which resistant strains were produced in vitro, we found that in certain circumstances these strains were unstable both in viability and in their degree of resistance. An investigation of the stability of resistant strains from patients also indicated that some of these tended to become less resistant during subculture without isoniazid, and probably to be then sufficiently sensitive to respond to therapeutic concentrations of the drug. Chemotherapeutic studies in mice and guineapigs were therefore made with two of these unstable strains and a variant of H37RV having a similar degree of resistance.

* In receipt of a grant from the Medical Research Council.

METHODS

Sensitivity Tests to Isoniazid

Liquid-medium tests were done in a modified Dubos 'Tween'-albumin medium (Medical Research Council 1948). Serial twofold dilutions of isoniazid in the range 100–0·012 μg. per ml. were prepared in 3 ml. volumes in $^1/_4$-oz. screw-capped bottles. They were inoculated with 0·02 ml. of a culture in the same medium, and the amount of growth was recorded after various periods of incubation at 37°C.

Solid-medium tests were done on Löwenstein-Jensen slopes containing 0, 0·2, 1, 5, 10, and 50 μg. per ml. added before inspissation for 1 hour at 80°C. The slopes were inoculated with a 3 mm. loopful of either a Dubos culture or a suspension of approximately the same turbidity prepared by grinding up growth from solid medium in distilled water. The degree of growth was noted after 14 and 28 days' incubation.

In both methods a control culture of the sensitive strain, H37Rv, was tested under identical conditions.

Production of Isoniazid-resistant Strains in Vitro

Resistant variants were obtained either from solid medium containing isoniazid after 6 weeks' incubation or by serial passage through increasing concentrations of isoniazid. This passaging was done by inoculating the series of fluid media used in the sensitivity tests and subculturing from the bottle containing the highest tolerated concentration of the drug into a fresh series of bottles, including one without isoniazid. In this way the degree of resistance was measured at each passage.

Stability of Isoniazid-resistant Variants

The stability of the resistance of the variant was measured by redetermining the sensitivity after one or more subcultures in Dubos medium without isoniazid.

In-vivo Resistance

The in-vivo resistance of the variants to isoniazid was measured in white mice (Schofield strain) and guinea-pigs treated subcutaneously with the drug.

The organisms were grown in Dubos medium with or without isoniazid. The wet weight of the culture was measured in a vaccine centrifuge tube, and the number of viable units—i.e., clumps of organisms developing into single colonies—was determined by the method of Fenner (1951) using oleic-acid-albumin agar. The mice (17–19 g.), in groups of twenty, were infected intravenously at the two dose levels of 1·0 mg. and 0·3 mg., and guineapigs in groups of six or eight were injected in the right thigh muscle with 1 mg. or 0·1 mg.

Each group of animals was subdivided, half being treated with isoniazid and half serving as untreated controls. Treatment was started immediately after infection and continued until the animals died from the infection or were killed at the end of the experiments. The dose of isoniazid was 10 mg. per kg. body-weight, given at both 9 A.M. and 5 P.M. daily, except on Saturdays, when only one dose was given, and on Sundays, when none was given.

Necropsies were made on the lungs of the mice, and a complete examination was made on the guineapigs. The organisms were recovered from the spleens of the guineapigs of the first experiment and tested for sensitivity to isoniazid.

RESULTS OF IN-VITRO EXPERIMENTS

Variant A

This resistant variant of the H37Rv strain was produced by passaging in Dubos medium containing isoniazid; the results are summarised in fig. 1. In this medium H37Rv is inhibited by about 0·025 μg. of isoniazid per ml. after 10 days' incubation (Mitchison 1952), but in the first passage growth began to appear in the bottles containing 0·8 μg. per ml. after 39 days and became heavy by 57 days. On the 57th day the growth in this tube was inoculated into the bottles of the second passage and the in-vivo sensitivity was measured in mice and guineapigs (variant A1). The results of the second passage showed that this growth was composed of resistant organisms and not of surviving sensitive organisms which had grown after the destruction of isoniazid during the long period of incubation. After 26 days' incubation the organism growing in 1·6 μg. per ml. of the second passage was passaged a third time, and the growth in the various concentrations showed that there has been a slight increase in resistance. Fourth and fifth passages made after 30 and 29 days' incubation, showed no further increase in resistance.

At the time of the third passage a sensitivity test was made on the organisms of the second passage growing in the medium containing no isoniazid. The result indicated that resistance gained during the first passage was readily lost, for even after this one passage through plain medium the organisms reverted to their original sensitivity. The in-vivo sensitivity of the organisms (variant A0) at this stage was also measured (see below). Similar in-vitro sensitivity tests made from the plain medium of third and fourth passages showed that the strain had become more or less permanently resistant. Finally, the strain from the fifth passage was subcultured seven times in plain medium without any loss of resistance.

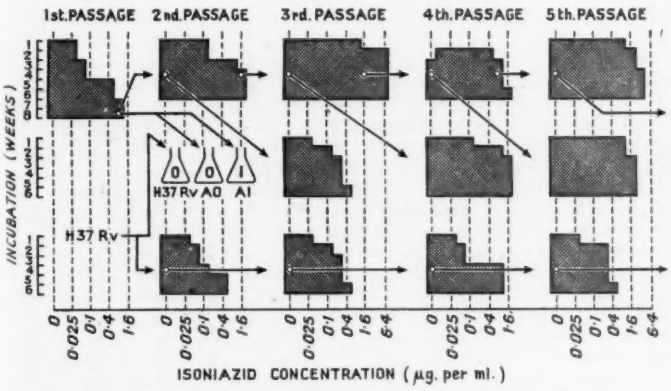
1st.PASSAGE
2nd.PASSAGE
3rd. PASSAGE
4th.PASSAGE
5th.PASSAGE
INCUBATION (WEEKS)
H37Rv
H37Rv A0 A1
0 0·025 0·1 0·4 1·6 0 0·025 0·1 0·4 1·6 0 0·025 0·1 0·4 1·6 64 0 0·025 0·1 0·4 1·6 0 0·025 0·1 0·4 1·6 64
ISONIAZID CONCENTRATION (μg. per ml.)

Fig. 1—Results of first five passages of variant A in liquid medium:

Top line: passages in medium containing isoniazid.
Middle line: passages to investigate stability of strains after one subculture in medium free from isoniazid.
Bottom line: H37Rv controls.
The flasks illustrate the history of the variants used in experiment 1: 0, no isoniazid; 1, 1 μg. of isoniazid per ml. in medium in flask.
The stippled areas represent growth at weekly intervals in presence of various concentrations of isoniazid. Arrows link the bottles containing the inoculum to the sensitivity tests set up from them. The vertical interrupted lines are drawn at intervals of every two concentrations.

Variant B

This resistant variant was produced independently, but in a similar manner to variant A from H37Rv. The period of incubation was 28 days for each passage. In the second and third passages series of bottles were set up not only from the bottles containing the highest tolerated concentrations of isoniazid but also from those with lower concentrations.

The results of the three passages are shown diagrammatically in fig. 2, from which it can be seen that organisms with a slight degree of resistance, produced by one passage in 0·1 μg. of isoniazid per ml., reverted to full sensitivity when cultured without isoniazid. Further, it shows that some of the resistant strains grew very poorly on subculture, suggesting that the

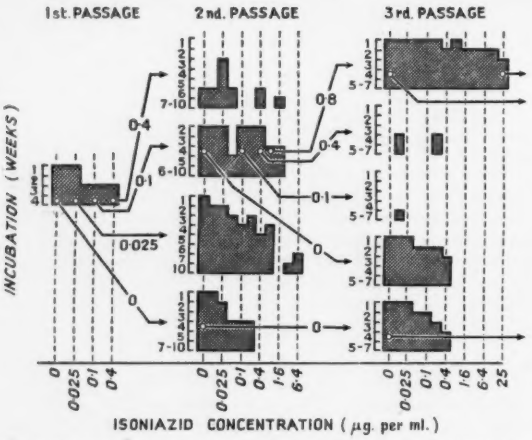

Fig. 2—Results of first three passages of variant B in liquid medium:

Shading indicates growth. The sensitivity test on the left was inoculated with H37RV ; arrows link the bottles containing the inoculum to the sensitivity tests set up from them and pass through numbers indicating the isoniazid concentration in the inoculum bottle. The vertical interrupted lines are drawn at intervals of every two concentrations.

cultures had poor viability. Similar poor viability occurred with strain A (passage 4, fig. 1), and the same tendency has also been observed in another series of resistant variants of H37RV.

A further series of four passages, in each case passaging from the bottle with the highest tolerated concentration and from the bottle without isoniazid, showed : (1) that it did not appear possible to obtain a resistant strain growing in more than 25–50 μg. of isoniazid per ml. ; (2) that, apart from reversion after a single passage in isoniazid, resistant strains subcultured once without isoniazid did not lose their resistance ; and (3) that the viability of the strain appeared normal after the third subculture.

The variant B was finally subcultured eight times without isoniazid without any loss of resistance.

Resistant Strains from Solid Medium

Serial twofold dilutions of isoniazid were made in Herrold's medium and Dubos oleic-acid-albumin agar medium as described previously (Mitchison 1952) and the slopes were inoculated with 0·02 ml. of a Dubos culture of H37RV and Pr, a strain recently isolated from a patient not previously treated with any chemotherapeutic agent. The degree of growth after 6 weeks' incubation is shown in table I. From the tubes indicated, colonies were picked off into Dubos medium without isoniazid, and after 18 days' incubation were tested for sensitivity. Among the variants originating from concentrations which had largely inhibited growth, three out of nine failed to grow in the first subculture ; and, of those that grew, one appeared to be of poor viability in the sensitivity test. Only one of the subcultures (Pr from Dubos medium containing 1·6 μg. of isoniazid per ml.) definitely proved to be resistant, but one other (H37RV from Dubos medium containing 0·4 μg. per ml.) grew in a higher concentration after 28 days' incubation than would be expected with a normally sensitive strain.

Summary

These experiments with resistant variants induced in vitro seem to show that (1) the variants rapidly revert to their original sensitivity after having been in contact with isoniazid for one subculture but do not revert after longer periods of contact, and (2) when first produced they tend to die more rapidly than do sensitive strains.

STABILITY OF RESISTANT STRAINS FROM PATIENTS

Twenty strains from patients were obtained by treating sputum with 4% sodium hydroxide and culturing on Löwenstein-Jensen medium. Sensitivity tests on solid medium were made on the resulting cultures. From the control tube of the test, two successive subcultures were made in Dubos medium, and from the second of these, after 10 days' incubation, a further sensitivity test was made. Thus the two sets of sensitivity tests were separated by three subcultures in medium without isoniazid.

The results are shown in table II. Of sixteen resistant strains six showed no loss of resistance, whereas ten showed a considerable loss. In only one strain, however, was the final sensitivity equal to that of a fully sensitive strain, suggesting that strains with a low degree of resistance are more stable.

RESULTS OF IN-VIVO EXPERIMENTS

Experiment 1

The resistance in vivo of the H37RV variant A1 was measured in mice and guineapigs. To obtain a sufficient number of organisms for the test, a flask of Dubos medium containing 1 μg. of isoniazid per ml. was inoculated from the tube of the first passage containing the highest tolerated concentration of isoniazid.

The instability following the first passage that had been demonstrated in vitro was also measured at the same time in vivo by infecting animals with the variant after a single passage in medium without isoniazid (variant A0). For this purpose a second flask of medium, without isoniazid, was inoculated with the same

TABLE I—SOLID-MEDIUM SENSITIVITY TESTS OF TWO SENSITIVE STRAINS AND GROWTH AND SENSITIVITY OF SUBCULTURES FROM COLONIES ON THESE SLOPES

Strain	Medium	Isoniazid concentration in solid medium (μg. per ml.)							
		0	0·025	0·05	0·1	0·2	0·4	0·8	1·6
H37RV	D	+++	+++	+++	++	+	+	1	0
	H	+++	+++	++	++	+	1	0	0
Pr	D	+++	+++	++	+	3	1	1	2
	H	+++	+++	++	+	+	+	+	0

Strain	Derivation of colony		Growth in liquid medium	Inhibitory concentration of isoniazid in liquid medium (μg. per ml.)			
	Medium	Isoniazid concentration (μg. per ml.)		Days' incubation			
				7	10	14	28
H37RV	D	0	+	0·1	0·2	0·2	0·4
	D	0·4	+	0·1	0·2	0·2	6·4
	H	0	+	0·1	0·2	0·2	0·4
	H	0·1	−	..	..	..	..
	H	0·4	+	N.G.	•	0·1†	0·8†
Pr	D	0	+	0·2	0·2	0·2	0·8
	D	0·05	+	0·1	0·2	0·2	0·4
	D	0·2	+	0·2	0·2	0·4	1·6
	D	1·6	+	25	25	25	25
	H	0	+	Not tested			
	H	0·05	+				
	H	0·2	−				
	H	0·8	−				

Figures indicate number of colonies on a slope. These results were read after 6 weeks' incubation.
+++, confluent growth. ++, innumerable colonies. +, 10–100 colonies.
D, Dubos oleic-acid-albumin agar medium.
H, Herrold's medium.
N.G., no growth.
• Growth in 0·025 μg. and 0·012 μg. per ml. only.
† No growth in control tube.

TABLE II—SENSITIVITY OF STRAINS OBTAINED FROM PATIENTS BEFORE AND AFTER THREE SUBCULTURES WITHOUT ISONIAZID

Strain	Inhibitory concentration of isoniazid in solid medium (μg. per ml.)	
	Before subculture	After subculture
St 0	0·2	0·2
Su 0	0·2	0·2
C 0	0·2	0·2
M 0	0·2	0·2
St 1	5	10
M 1	5	5
Jn 1	5	5
P 1	10	10
Ra 2	50	50
Se 1	>50	>50
Ro 1	50	5
Ra 1	>50	10
C 1	>50	10
W 1	>50	5
L 1	>50	5
Su 1	>50	1
M 2	>50	1
J 1	>50	1
Sm 1	>50	1
Jo 1	>50	0·2

The first four strains were obtained before treatment with isoniazid. The remaining strains were obtained during or after treatment with isoniazid.
The inhibitory concentration of isoniazid is that which permitted the growth of 20 or less colonies.

organisms as were used to inoculate the first flask; thus the strain had been passaged once in the presence and once in the absence of isoniazid. A third flask was inoculated with H37RV as a control.

In the absence of isoniazid, growth of H37RV and its variant A0 began to appear in 6 days, but that of variant A1, growing in the presence of isoniazid, was not visible until 19 days. On the 26th day the cultures were harvested, the wet weights of bacilli were determined, viable counts and liquid-medium sensitivity tests were made (results in table III), and mice and guineapigs (430–690 g.) were injected. The guineapigs each received 1 mg. of bacilli.

The mouse experiment was continued for 50 days, and the results are given in table IV. Isoniazid fully protected the mice infected with H37RV and with the originally resistant culture A0, which according to the in-vitro test (table III) had reverted to full sensitivity, but it afforded only partial protection against 1 mg. of the resistant culture A1.

The macroscopic appearances at the necropsies of the guineapigs killed after 37 days are shown in fig. 3. Apart from that at the site of inoculation and glandular involvement near it in two of the guineapigs injected with A1, there was no macroscopic evidence of tuberculosis in any of the treated animals, whereas the organs of untreated animals were always found to be severely affected. There was the usual histological appearance of tuberculosis in the organs of untreated animals, with early caseation in a few of the tubercles. The organs of two of each group of the treated animals were also examined histologically, and no evidence of tuberculosis was found in any of the lungs or livers, but in the section of the spleen of one animal infected with the A1 culture there were six small tubercles.

Sensitivity tests on solid medium of the organisms recovered from the spleens of the untreated animals showed them to have the same sensitivity as those injected. Only two of the nine cultures from the treated animals yielded growth, and both of these were from animals infected with culture A1; in one culture only one colony grew, and in the other there were only two colonies. The first proved to be as resistant as A1, but the second was slightly more resistant, yielding a confluent growth on 1 μg. of isoniazid per ml., and innumerable colonies on 5 μg. per ml.

Experiment 2

Strains M0, M1, and M2 were obtained from the sputum of a patient with pulmonary tuberculosis. M0 was obtained before treatment with isoniazid, and M1 40 days, and M2 62 days, after treatment with 200 mg. of isoniazid daily had begun. These strains were isolated on medium without isoniazid, and sensitivity tests on solid medium were set up from these primary cultures. Strain M1 was inhibited by 5 μg. of isoniazid per ml., and strain M2 grew well in 50 μg. per ml. Bottles of Dubos medium were inoculated from the control tube of the tests, and flasks of Dubos medium were then inoculated from these bottles. After 13 days' incubation the wet weight of bacilli was determined and a viable count on oleio-acid-albumin agar, with and without 2 μg. of isoniazid per ml., and sensitivity tests on solid and liquid media were set up. Mice and guineapigs (345–460 g.) were infected, the latter receiving 0·1 mg. each. The results of the sensitivity tests (table III) show that there had been a decrease in resistance during the subculturing of the strains M1 and M2, both now being comparable in resistance to variant A1.

The results of the mouse experiments are given in table IV. Isoniazid appeared to give complete protection against the strain isolated before treatment but only partial protection against the two resistant strains. The necropsies on the mice surviving to the 79th day showed that the lungs of the treated mice infected with M0 contained scanty tubercles, whereas those infected with M1 and M2 strains contained numerous tubercles. All the strains had about the same degree of virulence, which was better related to the viable count than to the weight of bacilli injected.

The guineapigs (345–460 g.) were infected with 0·1 mg. of the three strains and were killed after 43 days. The macroscopic post-mortem appearances are shown in fig. 3. Apart from tuberculosis at the site of inoculation and in the local glands, especially in animals infected with M2, and the presence of four microscopic tubercles in the

TABLE III—ISONIAZID SENSITIVITY OF STRAINS USED FOR EXPERIMENTS ON ANIMALS

Fluid Medium

Expt. no.	Strain	Minimal inhibitory concentration of isoniazid in liquid medium (μg. per ml.) — Period of incubation (days)				Number of viable units per ml. of culture — Isoniazid concentration (μg. per ml.)	
		7	10	14	28	0	2
1	H37RV	0·012	0·2	0·4	0·4	$2·2 \times 10^7$	Not tested
	A0	0·025	0·2	0·2	0·4	$1·2 \times 10^7$	
	A1	1·6	6·4	12·5	12·5	$3·2 \times 10^7$	
2	M0	0·05	0·05	0·05	0·8	$2·8 \times 10^7$	9
	M1	0·4	0·8	0·8	12·5	$1·3 \times 10^7$	14
	M2	0·4	0·8	0·8	1·6	$4·2 \times 10^6$	1·3

Solid Medium

Culture	Strain	Growth on solid medium containing isoniazid concentration of isoniazid (μg. per ml.)					
		0	0·2	1	5	10	50
Primary culture	M0	+ + +	0	0	0	0	0
	M1	+ + +	+ + +	+ + +	0	0	0
	M2	+ + +	+ + +	+ + +	+ + +	+ + +	+ + +
Injected into animals after 3 sub-cultures	M0	+ + +	0	0	0	0	0
	M1	+ + +	+ +	100	0	0	0
	M2	+ + +	+ + +	10	0	0	0

Solid medium tests read after 28 days' incubation.
+ + +, confluent growth.
+ +, innumerable colonies.
Numbers indicate numbers of colonies on slope.

spleen of one animal infected with M2, there was no evidence of infection in the treated animals. Tuberculosis was widespread in the untreated animals.

DISCUSSION

In a rather ambiguous statement Steenken and Wolinsky (1952) implied that attempts to induce resistance by serial subculture in increasing concentrations of isoniazid at 14-day intervals produced little or no increase in resistance. A longer period of incubation, 26–57 days in our experiments, allowed a definite and more rapid development of resistance. During this period growth occurred in progressively higher concentrations of isoniazid. Goulding et al. (1952) and Mitchison (1952) have described the destruction of isoniazid in Dubos medium at 37°C, and it might be thought that persisting sensitive organisms were growing because the isoniazid was destroyed. However, the resistance of the strains during the next passage was increased, though not always to the extent that might be expected from the isoniazid concentration originally in the inoculum bottle. It thus seems likely that a combination of selection of resistant bacilli and destruction of isoniazid is responsible for the shift in the inhibitory end-point found during prolonged incubation, as suggested by Goulding et al. (1952).

The previous reports on the stability of artificially produced isoniazid-resistant strains have been rather confusing. Pansy et al. (1952) reported that variants of B.C.G. grown once in the presence of isoniazid tended rapidly to revert to sensitivity. This was also found by Szybalski and Bryson (1952) using *Myco. ranæ*, and they suggested that it might have been because the resistant variant had been rapidly overgrown by faster-growing sensitive organisms. Knox et al. (1952) and Fisher (1952) stated that resistant variants of H37Rv derived by multiple passage in the presence of isoniazid (similar to our variant B) were stable on subculture without isoniazid. These reports are therefore in agreement with the behaviour of our two resistant variants A and B which were unstable only after the first passage in the presence of isoniazid. The initial instability was also confirmed by the in-vivo tests, since mice infected with variant A1 were only partially protected by isoniazid, whereas mice infected with variant A0 were completely protected.

Three possible mechanisms for the initial instability can be suggested :

(1) When an inoculum from the growth in medium containing isoniazid was transferred to medium without isoniazid a few sensitive organisms surviving the bacteriostatic concentration were also transferred. These might grow more rapidly and take the place of the resistant ones in the isoniazid-free medium. This explanation is unlikely since, even if the resistant strain did not multiply at all, a sufficient number of resistant bacilli would be transferred from the isoniazid-free medium to initiate growth in the subsequent sensitivity test.

(2) The resistant organisms may have had poor viability, and most or all of them may have been dead when transferred to isoniazid-free medium. Sensitive organisms, present either as survivors or (less likely) as black mutants from the resistant population might then have multiplied and taken their place. This seems probable, since with both variants A and B it was shown that some of the resistant cultures appeared to be poorly viable after the first two or three subcultures in the presence of isoniazid. Fisher (1952) has shown that a strain similar to B differs in its growth requirements from H37Rv since it did not grow in a purely synthetic medium. Further, some subcultures from colonies on solid medium containing isoniazid failed to grow on subculture, a finding also reported by Karlson and Ikemi (1952a).

(3) The process of development of resistance may not involve selection of mutants but may depend on the formation of an adaptive enzyme system not genetically determined. This system, though at first unstable, might acquire stability during growth in the presence of isoniazid and be transmitted to subsequent generations. This explanation involves acceptance of the theory of inheritance of acquired characteristics and appears unduly complicated.

Similar mechanisms may be involved in the tendency of resistant strains from patients to lose part of their resistance. It should be noted that our strains were subcultured entirely without isoniazid ; hence it would be likely that they contained a proportion of more sensitive organisms which had survived the effect of the isoniazid present in the body. It is therefore more probable that these sensitive

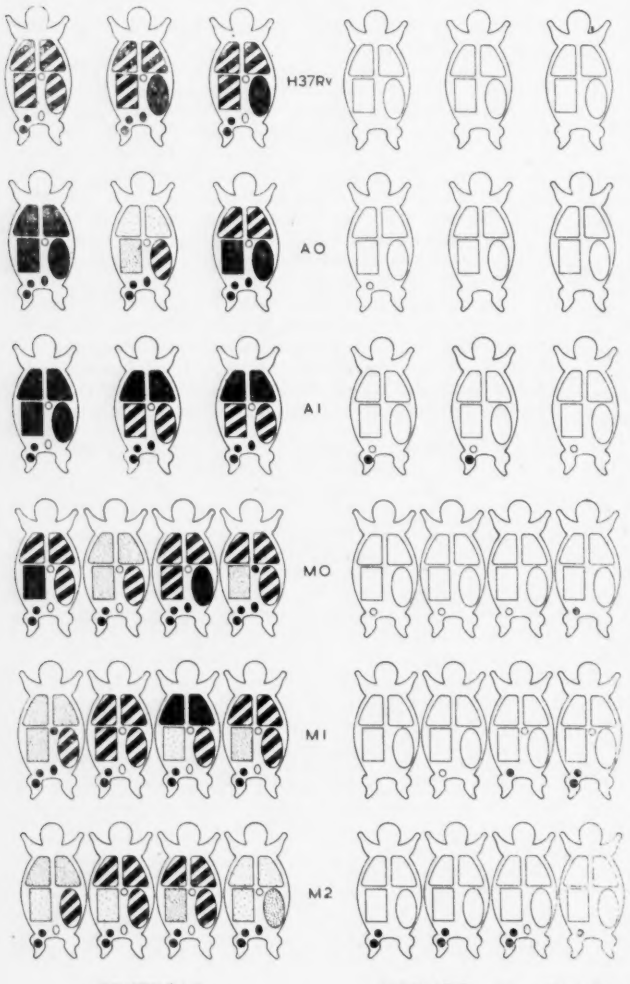

Fig. 3—Chemotherapeutic experiments in guineapigs :

The extent of tuberculosis in the organs is indicated by the degree of shading, complete shading indicating maximal involvement, and stippling minimal involvement. The liver is indicated by a rectangle, and the spleen by an oval. From the right leg upwards are indicated the site of inoculation, the draining inguinal glands, the sublumbar gland, and the cœliac gland. Enlarged glands are marked by open circles, which are shaded if the glands were caseous.

TABLE IV—CHEMOTHERAPEUTIC EXPERIMENTS ON MICE

Expt. no.	Strain	Infecting dose per mouse: Mg.	Infecting dose per mouse: Viable units	Dose of isoniazid (mg. per kg. per day)	No. of mice surviving on day: 15	24	36	50	79	Average day survival at 50 or 79 days	Appearance of lungs of survivors
1	H37Rv	1·0	$1·5 \times 10^7$	..	9	5	2	1	..	26·2	+ + +
				20	10	10	10	10	..	50·0	
		0·3	$4·6 \times 10^6$	..	10	8	6	4	..	38·7	+ ± +
				20	10	10	10	10	..	50·0	
	A0	1·0	$6·9 \times 10^6$	..	10	5	2	0	..	26·9	
				20	10	10	10	10	..	50·0	
		0·3	$2·1 \times 10^6$	..	10	10	10	10	..	50·0	+ ± +
				20	10	10	10	10	..	50·0	
	A1	1·0	$4·0 \times 10^7$	..	2	0	0	0	..	9·5	..
				20	10	10	9	8	..	46·9	± +
		0·3	$1·2 \times 10^7$	..	10	7	6	4	..	36·7	+ + +
				20	10	10	10	10	..	50·0	+
2	M0	1·2	$6·0 \times 10^7$	..	2	0	0	0	0	12·0	..
				20	10	10	10	10	10	79·0	+
		0·3	$1·5 \times 10^7$	..	10	10	7	2	0	41·5	..
				20	10	10	10	10	10	79·0	±
	M1	1·2	$2·6 \times 10^7$	..	1	0	0	0	0	9·6	..
				20	9	9	9	9	7	70·9	+ + +
		0·3	$6·5 \times 10^6$	..	9	9	7	0	0	36·9	..
				20	10	10	10	10	9	76·2	+ + +
	M2	1·2	$8·7 \times 10^6$	..	9	4	0	0	0	22·3	..
				20	10	10	9	9	0	55·4	..
		0·3	$2·2 \times 10^6$	..	10	9	6	4	0	45·1	..
				20	10	10	10	9	7	71·9	+ + +

In experiment 1 both treated and untreated mice were also infected with 0·1 mg. and all survived for 50 days.
±, only slightly enlarged.
+, few small tubercles.
+ +, few large tubercles.
+ + +, many large tubercles.

organisms had largely taken the place of the resistant ones during subculture rather than that the resistant strains had poor viability. It should be noted, however, that in only one strain did the culture revert to complete sensitivity.

The experiments on animals show that the three resistant variants A1, M1, and M2 were about as virulent as the original sensitive strains, and that isoniazid did not give complete protection against them. Protection was least in mice. Although treated mice survived the period during which untreated mice died, some of them died later, and the survivors were found to have more tubercles in their lungs than were found in the lungs of the mice infected with the sensitive strains.

In guineapigs isoniazid was more effective, for there was no macroscopic evidence of generalised tuberculosis in the treated animals. Nevertheless the protection was still incomplete, for in the spleens of two guineapigs, one infected with strain A1 and the other with strain M2, there were microscopic tubercles. Further, of the eleven treated guineapigs six had a caseous abscess at the site of inoculation and caseation of the draining lymph-gland, whereas only one of the seven treated animals infected with the sensitive strains had developed a caseating gland, and none had abscess formation.

The partial protection by isoniazid against these resistant strains may be due to the inocula containing only relatively small proportions of organisms capable of growth in the concentrations of isoniazid in the tissues of the treated animals; for the sensitivity tests (table IV) showed that only a small proportion of the bacilli of the strains M1 and M2 could grow in the presence of 1 μg. of isoniazid per ml. Karlson and Ikemi (1952b) and Goulding et al. (1952) have shown that treatment with isoniazid does not affect the mortality or the development of corneal lesions in mice infected with highly resistant strains. Unpublished observations of ours show that strains only slightly more resistant than strains A1, M1, and M2 are at least as lethal in isoniazid-treated mice and guineapigs as in untreated animals. One such strain yielded heavy growth on 1 μg of isoniazid per ml., but no growth on 5 μg. of isoniazid per ml. Therefore it is reasonable to assume that bacilli capable of growth on solid medium containing 1 μg. or 2 μg. of isoniazid per ml. can grow in the tissues of animals receiving 20 mg. per kg. body-weight daily. This dosage is about five times as high as that used in the Medical Research Council (1952) trials but is nevertheless of the same order, and there is therefore some experimental evidence to support the assumption, made in their report, that strains growing in 1 μg. or more of isoniazid per ml. were resistant.

There seemed to be no essential differences between the results of the animal experiments with the three resistant strains, but apparent differences in in-vivo sensitivity in mice and guineapigs are of interest. Gray and Mattinson (1952) have shown that mouse inoculation is more sensitive in detecting small numbers of bacilli than has previously been thought, and they also showed that strain differences in mice were largely abolished if the experiments were allowed to run sufficiently long. Further, Knox et al. (1952) have pointed out that H37Rv is much more sensitive to isoniazid at 35°C than at 37°C. The average rectal temperature of mice is 34·3°C (Goulding and Robson 1952) and that of guineapigs 39·1°C (personal observations). The eventual death of mice and the degree of tuberculosis in survivors infected with strains A1, M1, and M2 after relatively long periods might therefore be due to a combination of the long-term lethality of the small number of resistant organisms shown to be capable of growth in 2 μg. of isoniazid per ml. (table I, strains M1 and M2) or to the relative sensitivity of the resistant strains.

It might be argued that, since 10^7 organisms of sensitive strains appear to contain some highly resistant bacilli in vitro, similar in sensitivity to strain B (Rist 1952, Steenken and Wolinsky 1952), the inoculation of as large a dose as 1 mg. of H37Rv into guineapigs in experiment 1 would lead to the death of these animals from multiplication of the resistant bacilli, or at least to the production of histologically detectable lesions. However, unreported experiments with strain B indicate that it is virulent to mice but not to guineapigs; so not all resistant bacilli may be able to set up active infection in guineapigs.

It will be interesting to see whether resistant strains of tubercle bacilli from patients treated with isoniazid tend to lose their resistance when treatment is stopped. If this happens in vivo and in manner similar to that in vitro, it might prove of benefit to treat these patients with a further course of the drug, since seven of the sixteen resistant strains which came from patients and were subcultured in the absence of isoniazid had a final sensitivity similar to or below that of A1, M1, and M2.

Finally, a comment on methods of testing the sensitivity of tubercle bacilli from patients can be made. Both Bowen and Collins (1952) and Joiner et al. (1952) have used a technique involving subculture in Dubos medium free from isoniazid before the final test in the same medium. The irregular loss of resistance that is likely to have taken place during such a procedure throws doubts on their results, and one must recommend a procedure using as little subculturing as possible.

SUMMARY

Isoniazid-resistant variants of H37Rv produced in vitro rapidly reverted to sensitivity if they had been in contact with the drug during only one subculture. This was confirmed by in-vivo sensitivity tests in mice. Resistant variants passaged more than once in the presence of the drug, retained their resistance without diminution during several passages in drug-free medium.

Resistant variants tended to have poor viability during the first three passages in the presence of isoniazid, but later their viability seemed normal.

Repeated serial passages, in Dubos medium, from growth in the highest tolerated concentration of isoniazid failed to produce a strain with an inhibitory end-point higher than 25–50 μg. per ml.

The level of resistance of ten out of sixteen resistant strains of tubercle bacilli from patients fell substantially during three subcultures in the absence of isoniazid.

Mice and guineapigs infected with sensitive strains were completely protected by isoniazid in dosage of 20 mg. per kg. body-weight daily. When mice were infected with in-vitro resistant strains (which showed scanty colonies on solid medium containing 1 μg. of isoniazid per ml. and heavy growth on solid medium containing 0·2 μg. per ml.) treatment with isoniazid considerably increased their survival-time. Guineapigs infected with the same strains were almost completely protected; and in guineapigs a chemotherapeutic response is likely even with strains that will grow in the presence of about 1 μg. of isoniazid per ml.

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AN OUTBREAK OF STREPTOCOCCAL INFECTION IN A MATERNITY HOSPITAL

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DURING the ten weeks from Nov. 1, 1952 to Jan. 3, 1953, the laboratory at this hospital received 38 swabs which grew Lancefield group-A β-hæmolytic streptococci. This is more than the total number of similar swabs received in the preceding five years; and the outbreak is still continuing. The relatively small number of times that these organisms were found between 1947 and 1952 is compatible with the decline in the number of patients admitted to fever hospitals with this type of infection. Gibberd (1937) suggested that this decline, which was first noted in the period 1935–37, might be in part due to a change in virulence of the prevalent organism. This suggestion was based on the observations of Colebrook and Kenny (1936) who showed that the mortality among patients admitted to the North Western Fever Hospital, London, with puerperal streptococcal infections had fallen from 22% in 1933 to 5% in 1936—before the introduction of the sulphonamides—and among the same patients the incidence of peritonitis had fallen from 7·4 to 2·6%.

The present outbreak is reported because:

(1) It suggests an increase in the virulence of the organism.

(2) 4 of the patients, including 1 infant, were very ill.

(3) A change in the sensitivity to sulphadiazine was observed.

(4) It may be a help to other hospitals to be forewarned.

On clinical grounds it was difficult to associate some of the cases with the outbreak; and this was confirmed when the result of Griffith typing became available, for it was found that 26 of the organisms isolated belonged to one type while the remaining 12 were of different types. 26 strains of type 13 (3/B3264) were isolated: 1 came from a throat swab and 13 from vaginal swabs of patients, 11 came from throat swabs of nurses and orderlies, and 1 from ward dust.

BACTERIOLOGICAL METHODS

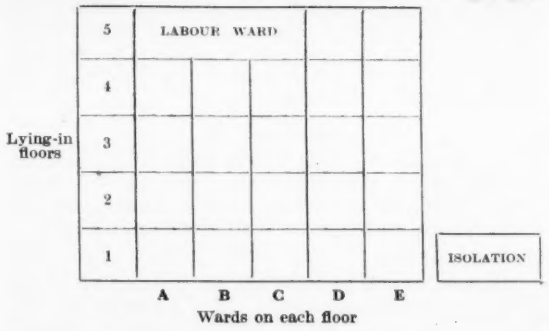
The organisms were isolated in most cases from routine high vaginal or throat swabs: in a few cases intrauterine swabs were taken and the organisms cultured from samples of uterine contents; this method of obtaining specimens will be discussed in a later paper. The swabs were spread on blood agar and incubated aerobically for eighteen hours and anaerobically for forty-eight hours. After incubation the plates were examined and those showing hæmolytic streptococci were subcultured into glucose broth, a plate microscope being used to help in obtaining single colony subcultures in difficult cases. A further broth was inoculated with several colonies to obtain, if possible, a profuse growth in eight hours. If there was an adequate growth, grouping by a modified Lancefield method was carried out, using organisms scraped from the surface of the plate. This direct grouping often gave a satisfactory result which enabled isolation measures to be imposed without delay. Occasionally, however, equivocal results were obtained, and in these instances an attempt was made to use the broth with the heavy, but possibly mixed, inoculum to obtain results the same evening. If this proved unsatisfactory, the broth from the single colony subculture was used for grouping the following morning; this broth was also used to obtain pure cultures to be sent to the Central Public Health Laboratory, Colindale, for typing. In addition a sensitivity plate was put up by the disc technique, using penicillin (in two strengths), chloramphenicol, and sulphadiazine. The sensitivity to sulphadiazine of the type 13 organisms and the other types isolated is shown in table I. The majority of the organisms received from the hospital cases were resistant to sulphadiazine, but so far the strains isolated have all shown normal sensitivity to penicillin and chloramphenicol.

While the methods described occasionally involved some duplication of work, they identified the group of the streptococcus as soon as possible. It was interesting to note that the morphology of the colonies was a very unreliable guide to the group—for example, in one instance an organism was practically non-hæmolytic on aerobic culture and only showed its true β hæmolytic nature on the anaerobic plate, but it was nevertheless a Griffith type-13 strain isolated from one of the severely affected patients. The quantity of growth, however, and in particular the presence of streptococci in pure culture were useful guides in assessing the severity of infection.

The throat swabs were taken in the usual way with precautions to avoid preliminary gargles or hot drinks. The plates were incubated aerobically for twenty-four hours. In one case a nurse, who was swabbed as a contact and found to have no streptococci in her throat,

TABLE I—SENSITIVITY TO SULPHADIAZINE

—	Type 13	Other types
Sensitive	3	5
Slightly sensitive	3	1
Insensitive	20	8



developed tonsillitis two days later, and this proved to be due to group-A streptococcus.

HISTORY OF OUTBREAK

This hospital consists of four floors for lying-in patients, each floor having 30 beds which are subdivided into five wards of 6 beds each; the fifth floor comprises the labour-ward suite, and there is a separate isolation ward. The layout is shown in the accompanying plan.

The outbreak started in November with a few sporadic cases, the first being a nurse who reported sick and was sent off duty until her throat was clear. Fourteen days later a baby developed erysipelas and was transferred to another hospital at once. Ten days later another nurse reported sick with a sore throat which was also found to be due to a hæmolytic streptococcus; and in another nurse the organism was grown from a small infected scratch. Despite the considerable interval between these cases and the rest of the outbreak, they were of the same Griffith type and appeared on the same floor. Throat swabs were taken from all contacts, but no positive swabs were obtained, and the ward 2D was closed and disinfected after all other patients had been transferred to the isolation ward. Disinfection consisted of sealing the windows and doors with tape and spraying the ward with 40% formaldehyde; the ward was then left sealed for forty-eight hours before being opened and aired. The technique was described by White

TABLE II—DISTRIBUTION OF CASES

—	1st floor	2nd floor	3rd floor	4th floor
November	—	1 nurse	—	—
	—	1 baby	—	—
	—	2 nurses	—	—
December	—	3 patients	1 patient	1 patient
	—	6 nurses	—	—
	1 case	4 patients	—	—
		1 nurse		
Jan. 1–14	—	—	3 patients	1 patient

(1936) who showed that satisfactory sterilisation could be achieved in this way.

Early in December a second group of 5 cases appeared: 3 were in ward 2D, and the other 2 on different floors. Further throat swabs were taken from the staff of the second floor and no less than 6 positive cultures were obtained. All 6 people were sent off duty, and they stayed away until 3 clear swabs had been obtained. The ward was again disinfected.

In late December another 5 cases appeared, 4 of them in the same ward, and the other on the first floor. No more positive swabs were obtained from the staff, but a blood-agar plate exposed in the ward grew a few colonies of group-A hæmolytic streptococci. In early January, 4 more cases were identified in ward 3A, where no positive cultures were obtained from the staff, and an isolated case appeared on the fourth floor. The distribution of cases is shown in table II.

In the early part of the outbreak it seemed that all the connected cases were in the same ward, the reservoir of infection being the nursing staff. After the Griffith typing became known, however, it was obvious that the isolated cases on the first, third, and fourth floors were connected with the main outbreak. If there had been cross-infection between these cases and those on the second floor, it must have taken place either in the large waiting-ward of the labour-ward suite or by way of a carrier among the staff. No evidence has been found to support the first possibility.

The clinical picture was variable, falling into three groups: mild or severe infections of the genital tract, and a miscellaneous group including a case of erysipelas. In 11 of the 14 patients who had genital-tract infections the illness was mild; a typical mild case had a temperature of 100·4°F on the fourth day, which persisted for twelve hours, with little general disturbance and rapid improvement after the administration of penicillin. The other 3 patients, however, were seriously ill for some forty-eight hours, the temperature ranging from subnormal to 105°F associated with rigors. All 3 showed varying degrees of uterine tenderness, a sign which in the pre-sulphonamide era implied that peritonitis was established. The response to penicillin and sulphonamide was much slower than in the mild cases, and the patients remained unwell for two to three days after the temperature had settled.

DISCUSSION

This outbreak of puerperal infections was far larger than anything experienced in recent years and could have been brought about by three main causes:

(1) A relaxation of antiseptic methods.
(2) An increased infection-rate in the surrounding population.
(3) An increase in the pathogenicity of the organism.

The antiseptic routine in the hospital has not been changed during the past five years. There seems to be a moderate number of cases of infection with group-A streptococci in other institutions and in the surrounding district, but the influence of rapid and effective antibiotic therapy on the infection-rate makes it difficult to assess the situation (*British Medical Journal* 1953). On the whole, however, it does not seem that the increase elsewhere is much greater than the normal seasonal rise, and in this connection it is important to note that the patients admitted from the district to the hospital isolation ward all had different Griffith types from the patients who fell ill in hospital. The infection spread from nurse to patient and back, and at the same time the ward dust became contaminated. The difficulty of controlling such a spread while continuing to admit cases, though well known in the past, has been largely forgotten of recent years. One is forced to consider whether the rise in the number of cases, and the severity of some of them, may not be due to an increase in the virulence of the infecting organism, aided by its passage through numerous hosts.

The outbreak continues, and since this paper was prepared we have had 3 more cases; one was mild, another was the most severe genital-tract infection of the outbreak, and the third was a streptococcal meningitis in an infant, the outcome of which is still in doubt. We feel it is important that this epidemic should be brought to the notice of those responsible for other maternity units in order that they may be on their guard against similar severe puerperal infections.

SUMMARY

An outbreak of 25 cases of infection with *Streptococcus pyogenes* occurred in a maternity hospital. The majority

of the organisms isolated were resistant to sulphadiazine. Sensitivity to penicillin was normal. The bacteriological methods used are described, and the implications of the outbreak are discussed.

We are grateful to Dr. R. E. O. Williams and his staff at the Colindale Reference Laboratory for typing our strains; to Dr. A. J. Cashman, registrar in bacteriology, who has undertaken many of the Lancefield groupings; and to Miss J. Gratwick for technical assistance.

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HEXAMETHONIUM COMPOUNDS IN THE TREATMENT OF PRE-ECLAMPSIA AND ESSENTIAL HYPERTENSION DURING PREGNANCY

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MOST workers agree that hexamethonium compounds will lower the blood-pressure temporarily, and Turner (1951) thought they might prove particularly valuable in the treatment of pre-eclampsia and essential hypertension in pregnant women. Apart from a recent report by Mulcahy (1952), no serious attempt to determine their value or dangers during pregnancy has been published. Accordingly I present an analysis of the results obtained in 10 cases.

OBSERVATIONS

As the treatment might involve hazards to the mother and especially to the fœtus, it was in general reserved for cases where the prognosis for the fœtus appeared very poor and where all the usual measures had failed.

Administration

Hexamethonium bromide was given either by mouth or by intramuscular injection. The summary of case-records (see table) shows the high dosage required when treatment was entirely by mouth. Even in non-pregnant patients the hypotensive dose varies considerably (Mackey and Shaw 1951), probably because of variations in absorption, and during pregnancy absorption is likely to be further impaired. In non-pregnant patients persistent hypotension (Hirson and Kelsall 1951) and paralytic ileus (Bourne and Hosford 1951) have been reported, and though these complications have not yet been recorded during pregnancy, the risk is presumably no less, and perhaps greater, in the pregnant. Even a transient hypotension, with its disturbance of uteroplacental blood-flow, might kill the fœtus. For these reasons oral therapy is probably

CASE-HISTORIES

Description of case	Maturity at start of hexamethonium	Dose and route	Effect on B.P.	Duration of treatment	Delivery	Fœtus	Hexamethonium estimations
1. Primigravida aged 38. B.P. at 16 weeks 180/110. Admitted at 21 weeks with B.P. 180/110. No albuminuria or œdema. Poor response to rest and sedation	26 weeks 31 weeks	125 mg., increased to 500 mg., by mouth 6-hrly. 80 mg. intramuscularly 4-hrly., increased to 150 mg. 3-hrly.	Nil Fair response at first. Resistance developed rapidly	6 days 30 days. Last injection 3 hours before delivery	Lower-segment cæsarean section at 36 weeks	5 lb. 3 oz. Vigorous at birth. Developed cyanotic attacks and died 72 hours later. P.M.: widespread purulent bronchopneumonia	Not performed
2. Primigravida aged 22. Admitted at 26 weeks with vaginal bleeding. B.P. 180/140. Urine normal. No response to rest and sedation	30 weeks	750 mg.–1 g. by mouth 6-hrly., increased to 1·75 g. by mouth, with 50 mg. intramuscularly 6-hrly.	Fair response at first. Resistance developed rapidly. Increased dose gave reasonable control. B.P. 120/80–140/110	20 days. Treatment continued till delivery	Spontaneous at 33 weeks	3 lb. 12 oz. Limp but soon responded. Developed signs of intestinal obstruction. Transverse colostomy. Died on 6th day. P.M.: no explanation except absence of ganglion cells in a narrowed but not obstructed segment of rectum	Not performed
3. Multigravida aged 44; three normal deliveries. Admitted at 26 weeks with B.P. 210/105, albuminuria, and œdema. Poor response to rest and sedation	27 weeks	1 g. by mouth 8-hrly.	Fair response. Stabilised at 160/100	35 days. Treatment continued till delivery	Spontaneous at 33 weeks	5 lb. 6 oz. Treated in premature-baby unit. Normal progress	Cord blood at delivery 9·3 µg./ml.
4. Primigravida aged 25. Admitted at 34 weeks with B.P. 140/90, albuminuria, and œdema. No response in 48 hours to rest and sedation	34 weeks	250 mg. by mouth, increased to 1·5 g. 8-hrly.	Good response after dose was increased	16 days. Treatment continued till delivery	Spontaneous after artificial rupture of membranes at 36 weeks	4 lb. 15 oz. Treated in premature-baby unit. Normal progress	At delivery: amniotic fluid 11·0 µg./ml.; maternal blood 3·6 µg.; cord blood 1·0 µg.
5. Multigravida aged 38; two cæsarean sections for pre-eclampsia. B.P. at 10 weeks 160/90. Admitted at 33 weeks with B.P. 190/110. No albuminuria or œdema. No response to rest and sedation	34 weeks	60 mg. intramuscularly 6-hrly., increased to 100 mg. 3-hrly.	Initially good response. Resistance soon developed. Increased dose gave satisfactory control	21 days. Last injection 15 hours before delivery	Lower-segment cæsarean section at 38 weeks	7 lb. 2 oz. No meconium for 20 hours. B.P. at birth 80/25. Progress otherwise normal	Maternal and cord blood at delivery: no hexamethonium detected

best avoided, and certainly should not be given to out-patients. Where intramuscular therapy was employed, an initial dose of 20 mg. was given and the blood-pressure was recorded every ten minutes, with the patient sitting up in bed. The dose was then slowly increased until a satisfactory fall in blood-pressure was obtained. The dose thus determined was usually given every three or four hours, provided the blood-pressure was 140/90 mm. Hg or higher. This precaution avoided periods of hypotension. The blood-pressure was recorded hourly by day and two-hourly by night.

Although all but 1 of the 10 patients showed a fall in blood-pressure, this fall never lasted longer than three or four hours and it varied considerably from case to case and from time to time, as has been found in non-pregnant patients (Wërko et al. 1951). To maintain a relatively stable blood-pressure was therefore more or less impossible. In most cases resistance to hexamethonium developed very rapidly, often over a period of days; but even when it ceased to lower the blood-pressure, the drug still caused the same degree of pupillary paralysis. This suggested that the autonomic blockade was still in force, but that the hypertension was now being sustained by the increased action of a humoral pressor mechanism.

Effect on the Disease

In the vast majority of cases of pre-eclampsia and essential hypertension, rest in bed and sedation are followed by satisfactory regression of signs and symptoms. Though we were usually able, with hexamethonium, to lower the blood-pressure, it is very doubtful whether this materially altered the ultimate course of the illness. No patient actively deteriorated and none developed eclampsia, accidental hæmorrhage, or gross renal damage, and it is therefore possible that the hypotensive treatment was of some value; but there was certainly very little evidence that the prognosis for the fœtus was improved. In some cases treatment may have been started too late, when extensive placental damage had already taken place; but the vascular changes that occur at the uteroplacental site in pre-eclampsia still remain obscure,

CASE-HISTORIES—*continued*

Description of case	Maturity at start of hexamethonium	Dose and route	Effect on B.P.	Duration of treatment	Delivery	Fœtus	Hexamethonium estimations
6. Primigravida aged 23. B.P. at 16 weeks 120/70. Admitted at 31 weeks with B.P. 150/80 and œdema. No albuminuria. Marked deterioration at 33 weeks. B.P. 170/110, albuminuria, and increasing œdema	33 weeks	100 mg. intramuscularly 4–6 hrly., increased to 250 mg. 3-hrly. (Also given ion exchange resins)	Good initial response. Resistance developed rapidly. Increased dose gave reasonable control. B.P. 140/90–160/100	19 days. Last injection 20 hours before delivery	Lower-segment cæsarean section at 36 weeks	5 lb. 14 oz. Vigorous at birth. Developed abdominal distension and general peritonitis. Died on 8th day. P.M.: peritonitis and distension of intestines with no obvious primary cause	At delivery: maternal blood, a trace; cord blood, none detected; amniotic fluid 5·7 µg./ml. Colostrum: none deetcted
7. Primigravida aged 38. B.P. at 20 weeks 160/100. Admitted at 30 weeks with B.P. 160/105. No œdema or albuminuria. Marked deterioration; B.P. rose to 190/120, with albuminuria	32 weeks	80 mg. intramuscularly 3-hrly., increased to 250 mg. 3-hrly.	No response	48 hours	Lower-segment cæsarean section at 32 weeks	3 lb. 3 oz. Treated in premature-baby unit. Normal progress	Not performed
8. Multigravida aged 28; premature stillborn deliveries in 1946 and 1947. B.P. at 14 weeks 150/90. Admitted at 28 weeks with B.P. 196/130 and albuminuria. No œdema. No response to rest and sedation	29 weeks	60 mg. intramuscularly 3-hrly., increased to 200 mg. 3-hrly.*	Resistance developed rapidly. Moderate response only to increased dose	22 days. Fœtal heart not heard after 18 days' treatment	Spontaneous at 32 weeks	Macerated. Placenta extensively infarcted. P.M.: evidence of intrauterine asphyxia	Not performed
9. Multigravida aged 33; three stillborn infants, with pre-eclampsia. B.P. at 12 weeks 160/90. Admitted at 29 weeks with twin pregnancy; B.P. 190/110 and albuminuria. No œdema. No response to rest and sedation	30 weeks	100 mg. intramuscularly 3-hrly.	Moderate response only	7 days. Fœtal heart not heard after 3 days' treatment	Spontaneous at 31 weeks	Both twins macerated. Infarction of placenta not sufficient to account for fœtal deaths	Not performed
10. Primigravida aged 28. Admitted at 30 weeks with B.P. 140/90–150/95. No albuminuria or œdema. Anencephalic fœtus with hydramnios	32 weeks	20 mg. intramuscularly 6-hrly., increased to 30 mg. 6-hrly.	Good response	14 days	Spontaneous after artificial rupture of membranes at 34 weeks	4 lb. 5 oz. Stillborn anencephalic	See note †

* *Case 8.*—After 2 days' treatment with hexamethonium bromide an extensive erythematous rash developed. This disappeared when the bitartrate was substituted for the bromide.

† *Case 10.*—Hexamethonium was given mainly to determine the rate of accumulation in the liquor:

After 2 days' treatment 30 oz. of amniotic fluid withdrawn, C6 content 0·5 µg./ml.
„ 8 „ „ 86 oz. „ „ „ „ „ „ 0·5 µg./ml.
3 days after stopping treatment 20 oz. of amniotic fluid withdrawn, C6 content 4·0 µg./ml
7 „ „ „ „ 54 oz. „ „ „ „ „ „ nil.

and the effect of hexamethonium on these changes could be harmful rather than beneficial.

Effect on Labour

In the cases where hexamethonium administration continued during labour it did not apparently alter the normal course.

Maternal Side-effects

On the whole the side-effects were not significant. All patients had blurring of vision, but they soon became accustomed to this. None had severe constipation. One showed sensitivity to bromide after two days' treatment, but this disappeared when the drug was changed for hexamethonium bitartrate.

Effect on Fœtus

Young (1952) has shown that, in does, hexamethonium passes freely across the placental barrier and can very soon be detected in the liquor. If a constant plasma level of hexamethonium is maintained, the hexamethonium content of the liquor increases until very soon it is well above that of the plasma. It then persists in the liquor for some considerable period after the last dose has been given. If the umbilical cord of the fœtus is tied, then the hexamethonium content of the liquor is very low, which suggests that it reaches the liquor via the fœtal urine. Analysis of the liquor in some of our cases tends to support these observations.

This accumulation of hexamethonium in the liquor may be of considerable clinical significance. From the liquor which it swallows, the fœtus will presumably re-absorb a certain amount of hexamethonium. The more immediate action of this will be on the intestine itself, and the fœtus may thus be born with a predisposition to paralytic ileus. This would explain the two cases in which the child apparently died from this cause and the further case in which there was delay in the passage of meconium. This point is still unproven, however; for in a further case, where the hexamethonium content in the liquor was relatively high, the infant showed no ill effect. Furthermore Mulcahy, in his series of 10 cases, did not observe any harm to the fœtus.

It is also possible that any aspirated liquor would have a somewhat similar effect on the respiratory system, reducing bronchial secretion. This may have been an important contributory factor in one case where the infant died from an extensive purulent bronchopneumonia. As hexamethonium is only slowly removed from the liquor, discontinuance of treatment twenty-four hours before delivery is expected would do little to prevent these possible complications.

CONCLUSIONS

Hexamethonium therapy during pregnancy should not be considered until the customary treatment of pre-eclampsia or essential hypertension has failed and unless the prognosis for the fœtus appears very poor. Because of the risk of hypotension and the rather variable response, oral therapy should be avoided. With intramuscular therapy the fall in blood-pressure is erratic and unpredictable, though it usually persists for three or four hours. Resistance to the drug may develop within a few days.

There is no definite evidence that hexamethonium treatment materially alters the course of the disease, but it may help to stabilise the condition. It seemed to have no significant effect upon the course of labour.

Hexamethonium is known to accumulate in the liquor. When swallowed, it may predispose to ileus in the newborn infant, and when aspirated it may reduce bronchial secretions and so favour respiratory infection.

My thanks are due to Mr. J. V. O'Sullivan, and Dr. A. S. Duncan for permission to include certain of their case-records; to Miss I. M. Young, who made the hexamethonium estimations; and to Prof. J. C. McClure Browne for his encouragement and help in the preparation of this report.

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CULTIVATION OF TOXOPLASMA GONDII IN TISSUE CULTURE IN MAMMALIAN CELLS

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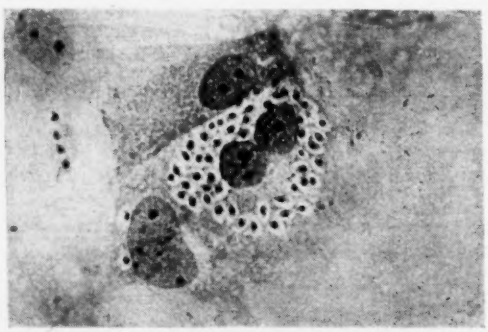
As is known, *Toxoplasma gondii* is an obligatory tissue parasite which cannot be grown in vitro in the absence of animal tissue in the medium. Meyer and de Oliveira (1945) and Mühlpfordt (1952) have described the cultivation of toxoplasma in avian tissues, but so far there has been no record of its cultivation in mammalian tissue, though mammals (including man) represent the most important hosts of this parasite.

Since this method might be of interest for chemotherapeutic tests and in the study of the life-history of toxoplasma, a short account is given of some preliminary experiments, made in 1948, on its behaviour in vitro in mammalian tissue.

Methods.—Explants of embryonic rat heart were allowed to proliferate on coverslips in Carrel flasks under a fluid medium containing 10% each of rat serum and embryonic extract in Tyrode's solution. This method is similar to that used by Hawking (1946) for *Trypanosoma cruzi*. After three or four days the tissue was inoculated by the addition to the flasks of a few drops of peritoneal fluid from a mouse infected with toxoplasma. Alternatively, the explants were placed in the peritoneal fluid before being fixed in the flasks (Lock 1950). The coverslips were withdrawn at intervals, and the tissue was fixed with Schaudinn's solution and then stained by Giemsa's method.

Results.—Invasion of the host cells (fibroblasts, macrophages, and probably muscle cells) and the subsequent multiplication of the toxoplasma within them was rapid. The accompanying figure shows the appearance of cultures eighteen hours after infection. In these preliminary experiments the penetration of cells by the parasite was not observed and mobility of the extracellular parasites was not definitely established. Under favourable conditions growth was observed up to ten days, but some cultures with numerous parasitised cells died within forty-eight hours. This did not appear to be due to the production of excess acid in the culture,



and there was no evidence of extracellular multiplication of the parasites under these conditions, although multiplication and liberation of parasites continued in leucocytes introduced with the infecting inoculum from the mouse.

These experiments were made in the Wellcome Laboratories of Tropical Medicine, London, and I am grateful to the director, Brigadier J. S. K. Boyd, F.R.S., for permission to publish the results.

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Medical Societies

ROYAL SOCIETY OF MEDICINE

Hypotension during Anæsthesia

ON Feb. 4 the society's section of surgery met under the chairmanship of Prof. F. A. R. STAMMERS, president of the section, to discuss Hypotension During Anæsthesia.

Dr. J. B. WYMAN put the anæsthetist's case for temporarily lowering the surgical subject's blood-pressure by autonomic ganglionic block with a pentamethonium salt. He based his remarks on experience of 1000 major operations, including 157 thyroidectomies and 135 mastectomies; the majority of patients were middle-aged, but 82 were over 70, and 22 under 20.

There were two advantages. Blood-loss was enormously reduced, and this gave the surgeon a clear, almost dry, operating field and shortened his operating time; and pentamethonium seemed to protect the patient against surgical shock. It was known that sympathectomised dogs could not be shocked irreversibly, and autonomic chemical blockade apparently offered similar protection. It was striking how patients remained in a good steady state throughout operations and were in fine form afterwards. He cited 2 cases of hæmatemesis in elderly people where blood-transfusion failed to raise the blood-pressure or relieve shock, but an injection of pentamethonium produced immediate improvement. One of these patients was a man of 80 with an undetectable systolic pressure when his emergency partial gastrectomy was decided on. After 100 mg. pentamethonium his blood-pressure was unchanged but his condition became better; he was discharged from hospital 14 days after the operation. Established shock was clearly not an absolute contra-indication to controlled hypotension, as had at first been believed.

Two risks with pentamethonium everyone had in mind were that it might provoke a vascular accident, or that it might cause a failure of adequate blood-supply to an important organ—which was why asphyxia from any cause was another contra-indication. It seemed, however, that the rate of linear blood-flow through an organ was more important to it than the volume of flow, and was not necessarily altered by hypotension. When coronary flow dropped, so did the work the heart had to do; and the worst that had been noted was a transient depression of the ST segment in some electrocardiographic leads. 114 patients with systolic pressures over 200 mm. Hg, of whom 11 had auricular fibrillation and 1 was in cardiac failure, seemed to do better on pentamethonium than with conventional anæsthesia. There was 1 case of cerebral thrombosis in the series, and there were 3 cases of pulmonary embolism occurring from 10 days to 3 weeks after operation. In general such sequelæ seemed to be unrelated to the hypotension.

Severe renal disease was a contra-indication to the use of pentamethonium, because the drug's excretion might be thereby delayed. The normal kidney went on secreting urine even when the systolic pressure dropped to 60 mm. Hg (as shown by ureteric catheterisation during operation); but there was sometimes transient post-operative oliguria for 24 hours or so, and in such cases intravenous saline would speed up recovery.

Methylamphetamine hydrochloride was usually used as antagonist to pentamethonium; but it was unsatisfactory, because as a cerebral stimulant, it made patients restless, it was easy to overdo the dose, and at the same time its effects might wear off too quickly and it might lead to unnoticed hypotension later. Morphine could be safely used postoperatively even if the blood-pressure was still low.

In this series of 1000 cases 5 deaths occurred—2 from disease, and 3 from faulty technique—before it was realised how heavy were the penalties for the slightest infraction of the anæsthetic routine.

Mr. ROBERT COX said that the surgeon did not realise how much blood a patient might lose in an ordinary operation. By soaking all used swabs and towels in a known volume of water, adding the contents of the sucker bottle, and measuring the final hæmoglobin level for comparison with the patient's preoperative hæmoglobin level, he had been able to calculate this loss. In a thyroidectomy the loss might be 250 ml., in a radical mastectomy nearly 700 ml., in a prostatectomy 550 ml.: if pentamethonium was used the loss dropped to 30 ml. only. Fewer patients needed a postoperative blood-transfusion. After prostatectomies the urine became clear sooner, and in 44 cases he had only 1 with clot retention.

In longer operations lasting up to 6 hours, such as thoracotomies for œsophageal obstruction, he was impressed by the strikingly fit state of the patient at the end of the ordeal. Orthopædic, plastic, and thoracic surgeons among his colleagues also praised the effects of pentamethonium, which helped to speed operations. The risks of postoperative reactionary hæmorrhage and hæmatoma disappeared as soon as the surgeon became accustomed to tying even small bleeding-points. He had found no increase in thrombosis or in renal or liver failure. In the ward after operation patients were nursed in the head-down position until the blood-pressure, recorded half-hourly, began to recover; then they were gradually brought horizontal and then upright. Oxygen had to be available and could settle the restless patient. He had found that phenylephrine was a better antagonist than methyl-amphetamine.

Controlled hypotension was obviously valuable in increasing the surgeon's view, particularly in operations such as fenestration for otosclerosis where there was usually considerable bleeding. But he felt that the ability of pentamethonium to shield the patient from shock was even more valuable and made its use of very wide application.

Dr. JOHN GILLIES was a proponent of high spinal block—the oldest method of inducing controlled hypotension, and still the most certain one. He pointed out that motor paralysis, sensory block, and hypotension were all obtained with a single injection, which left the breathing largely unaffected and therefore indicative of the state of the medulla. In contrast, intravenous hexamethonium bromide was less certain and its effects were complex. Dr. H. W. C. Griffiths and he had used high subarachnoid block in 802 cases, including 51 partial gastrectomies, 63 urological cases, 341 thoracolumbar splanchnicectomies, and 222 lumbar sympathectomies. The majority suffered from cardio-vascular disease and were poor risks. There had been 7 deaths: 2 on the table, early in the series; 4 from cerebrovascular accidents in patients who had had preoperative episodes; and 1 following reactionary hæmorrhage. 1 patient who developed a coronary occlusion during induction made a good recovery. 3 patients suffered postoperative oliguria, and 7 had transient ischæmia of limbs already affected by vascular disease. He ascribed the latter to an almost complete

stoppage of blood-flow through affected vessels when hypotension was induced, and regarded arteriosclerosis as a contra-indication to use of the technique. So were myocardial disease and malignant hypertension; but cases of essential hypertension benefited, and the circulatory fluctuations arising during removal of a phæochromocytoma might be more easily managed. He felt strongly that hypotension should only be induced if it would be good for the patient. It demanded skilful management, especially if it continued into the post-operative period when accidents were most likely to occur.

In the ensuing discussion there was some criticism of the number of deaths, and one anæsthetist said he had abandoned pentamethonium because the slightest accident threw the patient into jeopardy. People were also troubled by the suggestion that pentamethonium averted serious surgical shock. In the Manchester neurosurgical unit the drug was used very cautiously in cases of cerebral angioma, vascular meningioma, and aneurysm just for the 30–60 minutes when hæmorrhage was most likely, methylamphetamine being given as soon as the risk was past. Another speaker mentioned a reflex whereby lowered carotid-sinus blood-pressure led to bronchial dilatation, and said that barrel-chested bronchitics with laboured breathing often improved as the blood-pressure fell during the action of pentamethonium.

NUTRITION SOCIETY

The Psychology of Eating

PRESIDING at a conference held at Aberdeen on Jan. 31 by the Scottish Group of the Nutrition Society, Prof. REX KNIGHT said that the contributions would illustrate the five main features of contemporary psychology: (1) the replacement of anecdote and the literary essay by controlled observation and experiment; (2) the unconscious nature of the tendencies underlying conduct; (3) a renewed interest in the constitution of individuals as opposed to their environmental influences; (4) the emphasis on social factors in the development of personality; and (5) the attempt to relate psychological phenomena to underlying physiological mechanisms.

Reviewing the psychiatry of disturbances of eating and of nutrition Prof. W. M. MILLAR said that the relation between the mental disorder and the abnormality of feeding was sometimes obvious, as in vitamin deficiency, but it was more often complex and obscure because it was emotional and symbolic. In some mental disorders a loss of interest in life was reflected in a desire for starvation and death; in others abnormal fears led the patient to think that food would cause intestinal obstruction. Sometimes what began as an eccentricity about food might develop into a way of life—vegetarianism, for example. Emotions such as rage and fear had an undoubted though obscure influence on gastric function. The rhinencephalon, which was concerned with the functions of central emotion, was capable of accrued, effective, emotional experience which was symbolic, non-verbal, and undiscriminating. The rhinencephalon was not closely connected to the cerebral cortex; therefore two independent sets of thoughts could exist. In this way intelligent people might be the victims of irrational emotions and fears. In spite of much careful case-taking our understanding and treatment of psychosomatic disorders was disappointing. Often the patient had no conscious awareness of the stresses of life which upset his gastric function; the true nature of the relevant stress often remained obscure because neither the patient nor the doctor was willing to discuss the subject.

Prof. C. F. W. ILLINGWORTH discussed the psychological accompaniment of peptic ulceration. He agreed that there was undoubted evidence of a connection between the mental state and gastric function, but it was not clear how this was causally related to peptic ulceration. The published observations on the patient Tom recorded that when Tom was defeated his gastric mucosa grew pale and his acid secretion fell. When Tom was angry his gastric mucosa became hyperæmic and secreted acid. But exactly the opposite results were observed in another patient, Doris, a Negro lady. Most patients with peptic ulcers were of a particular temperament and type—tense, driving, active, underweight, possibly obsessional in some degree. But the relation of this mental state to the peptic ulcer was quite unexplained. Many of the mental stresses which had been adduced as causes of peptic ulcer had been shown by careful work not to be important—for example, mental conflicts of infancy and childhood, the death of parents, unhappy homes, and divorces. Perforation of an ulcer or hæmorrhage might follow acute psychological stresses, but this relationship was neither the whole explanation nor invariably present. During the war, for example, a sharp rise in the incidence of perforated ulcers was correlated with the air-raids of 1940–41 on London. In Glasgow there was a similar increase in the incidence of perforations but it came just before the raids. Moreover, the peaks in the graph of acute complications of ulcer did not show in the data for women, who suffered perhaps greater war-time stresses than male civilians. We must admit that psychological stress could be important but we must not overemphasise its rôle, lest we prevent adequate investigation of other influences which might be more important.

Dr. C. F. ROLLAND emphasised that anorexia nervosa was a clinical entity but not a very common one: in Prof. D. M. Dunlop's wards at Edinburgh Royal Infirmary there had been 25 cases in fifteen years. Anorexia nervosa was the outcome of serious mental disorder which was neither hysterical nor obsessional. Often the mental cause was obscure, but if it could be discovered and explained there was reasonable hope that the patient would respond to encouragement and suggestion. He quoted the case of a schoolgirl aged 16 years who was much afraid of her mother. When the patient was aged 13 a girl in her school became pregnant and the resulting scandal made a great impression on the patient. Her own plumpness of figure led to her being teased by her schoolmates to the effect that she too might be pregnant. Accordingly she ate little in order to become thin, and by the time she was 16 years of age she had lost all appetite. She made a good recovery in response to sympathetic explanation, encouragement, and suggestion. Young spinsters were most often affected, and amenorrhœa was a common and persistent feature. The breasts often remained well developed in spite of the general emaciation. Patients under treatment must be carefully watched for tricks such as secreting food, taking cathartics, and deliberately inducing vomiting. Concentrated food such as calcium caseinate might be coloured and offered as a medicine, ostensibly for the treatment of constipation. Insulin, testosterone, adrenocorticotropic hormone, cortisone, and isoniazid were not of value in treatment of this condition.

Dr. J. M. WALKER dealt with the physiological effects of smoking, a subject on which, as he told the meeting, the New York City Library had over 4000 volumes. Much of the evidence was subjective, emotionally coloured, and hard to assess. Most studies dealt with acute effects. His own paper dealt largely with the effects on nutrition. When a person stopped smoking his weight increased and his appetite improved. Why had smoking this effect on appetite and weight? Among other possibly important effects, cigarette-smoking liberated adrenaline and this raised the blood-sugar, which reduced sensations of hunger. Tentatively he suggested that nicotine also acted on the hypothalamus in much the same way as amphetamine, which also reduced appetite. In the light of this suggestion he was interested to find that the effect of smoking on urinary output after drinking water was to

delay diuresis but to increase the total volume of fluid excreted. This was not a blood-pressure effect since it was not abolished by hexamethonium.

Discussing the effects of lesions of the hypothalamus on appetite, Dr. C. G. KENNEDY reviewed the knowledge of Fröhlich's syndrome. It was now realised that the obesity, sexual infantilism, and increased appetite did not originate directly from the pituitary tumour itself but from its effects on the hypothalamus. In animals lesions had been made in the hypothalamus by a route which rendered it possible to avoid injuring the pituitary at the same time. Within twenty-four hours the experimental lesion led to an increase in appetite, so that the animal ate twice as much as its littermate control. This was accompanied by the development of marked adiposity. The limit was reached in about fifty days when the total fat of the animal amounted to 70% of its body-weight. If the animal was then starved, the increased appetite returned when it was again offered food. If the food was diluted with inert material, the animal ate enough additional food to make up for the diluent. Small lesions produced experimentally in a site lateral to the hypothalamus could produce the opposite effect on appetite even in rats made obese by an operation on the hypothalamus. Discussing a tentative scheme to explain the observed facts, Dr. Kennedy suggested that the cells of the hypothalamus might be sensitive to chemical rather than to thermal influences, that the feeling of satiety might be conditioned by the cerebral cortex and that hunger might be represented at a lower level than the hypothalamus.

In closing the meeting Professor KNIGHT revealed that the topic for discussion had been suggested by members interested in domestic science who wanted some help with their problem of making certain articles of food more acceptable to children. The outcome of their suggestion was doubtless different from what they expected but he hoped that they were not wholly disappointed.

MANCHESTER MEDICAL SOCIETY

Ulcerative Colitis

ADDRESSING the society's sections of medicine and pathology on Jan. 14, Prof. L. J. WITTS said that although ulcerative colitis had been described by Wilks and Moxon in 1875, modern interest in the disease started from the end of the 1914–18 war. The ætiology of the disease was still unknown, but it was a severe inflammatory disorder of the colon which produced damage akin in degree to a 3rd-degree burn. In about half the cases the illness was chronic and protracted, and few patients went for ten years without a second attack. About 20% of patients died in the first year of the disease, and nearly a third were dead by the end of five years. Complications were numerous and troublesome, and there was evidence of a high incidence of carcinoma after an incubation period of ten to fifteen years.

Medical treatment consisted essentially in rest, a high-protein low-residue diet, and measures to correct malnutrition, anæmia, and depletion of body-fluids and electrolytes. Remarkable effects were claimed for psychotherapy, though this did not as a rule cause resolution of the anatomical changes in the colon. Surgical treatment had become increasingly more radical, and permanent ileostomy together with removal of the colon and rectum was now favoured. It was logical to try A.C.T.H. and cortisone, because of their euphoric effect and their non-specific beneficial influence on inflammation. There was evidence that they might produce symptomatic amelioration, including gain in weight and decrease in diarrhœa; but they likewise did not seem to produce objective improvement in the colon. Professor Witts referred to a Medical Research Council trial of cortisone in which five regions were coöperating, and which should eventually reveal whether the advantages of cortisone outweighed its disadvantages.

Reviews of Books

Text-book of Surgery

Editor: H. F. MOSELEY, M.A., D.M., M.CH. Oxfd, F.A.C.S., F.R.C.S., assistant professor of surgery, McGill University. London: Henry Kimpton. 1952. Pp. 896. 110*s*.

A great effort has been made in this book to meet the requirements of the modern student. Written by the younger members of McGill University, it has freshness of outlook and vitality. Otorhinolaryngology and gynæcology, as specialties, are omitted, but otherwise it contains all the undergraduate should know. The facts are presented in an attractive fashion by experts in their several departments, and the illustrations are enlivening. Emphasis is laid on the newer developments of surgery—vascular, thoracic, neurological—and this is done to some extent at the expense of the older aspects. Thus, while nothing could be better than the review of the surgical treatment of portal hypertension, which occupies 5½ pages, the very common and still unsolved problem of enlarged prostate is dismissed in a single page. But the whole book is so good that such occasional failures to reach its general high standard can be condoned in a first edition. It will be as popular in this country as it is bound to be in Canada.

Vesalius on the Human Brain

Translated by CHARLES SINGER. London: Oxford University Press. 1952. Pp. 151. 21*s*.

THIS is the first book to contain a translation into English of any substantial part of the text of that landmark in history, the *Fabrica*, printed in 1543. Before Vesalius, there had been several ineffective attempts to introduce figures into anatomical narrative. But, omitting Leonardo (who failed to publish his researches) no-one had relied on visual impressions for the exposition of a series of investigations. It does not detract from his achievement that Vesalius was not his own draughtsman; for his was the mind that conceived the plan, his the hand that made the preparations, his the voice that directed the artist, his the drive and energy that carried this excessively intricate and difficult research to a triumphant end. Yet this great work has never been widely read. Its text has always been largely inaccessible, even to the learned, and still eludes all but a few: for it is vast, verbose, repetitious, a very torrent of words; its idiom is awkward and conspicuously unsuited to its subject; its format is extremely inconvenient for the student's desk. We can but regret that Vesalius's literary skill did not equal the artistry of some, at least, of his draughtsmen. Dr. Singer in this translation has not attempted to be literal and has avoided many of the repetitions. He selected the section on the brain because it is short and self-contained and clearly shows the state of physiology before the time of Harvey: it is probably the maturest part of the work and makes fascinating reading. He provides an admirable introduction and an instructive series of notes, while the text is illustrated with the *Fabrica's* original figures. The Wellcome Trustees and Foundation must be thanked for making this book available.

Side Effects of Drugs

L. MEYLER, consulting physician, Groningen, Netherlands. Translated by Ph. VUIJSJE and W. MULHALL CORBETT. Amsterdam and London: Elsevier Publishing Co. 1952. Pp. 268. 30*s*.

Dr. Meyler rightly observes that more and more drugs with possible untoward side-effects are becoming available, and that the doctor should ask himself whether the condition he is treating justifies the risk entailed in prescribing the drug. There is certainly room for a book on this subject, particularly for reference when the prescription of an unfamiliar drug is being considered.

Side-effects which are mild and disappear immediately after cessation of the drug matter little. The side-effects

against which one should be forewarned are those liable to cause persistent sequelæ or fatalities, such as exfoliative dermatitis and agranulocytosis. But we need to know their incidence, and unfortunately Dr. Meyler does not give this in most cases. He tells us that agranulocytosis may follow diphenhydramine ('Benadryl'); but unless we know whether it is common, or has merely been described on one solitary occasion, we are little wiser. The section on acetanilide contains nothing beyond the following:

"cyanosis due to methæmoglobinæmia; hæmoglobinuria; porphyrinuria; irregular pulse; collapse; erythema. Prolonged use may give rise to secondary anæmia. General malaise; dizziness; palpitations; numb fingers; cardiac insufficiency; anorexia; psychic imbalance; icterus; deafness; hyperæsthesia; increased reflexes; perspiration; nausea; vomiting (Davison)."

This is not of much help. Among the many side-effects of aspirin mentioned, without reference to frequency are "damage to the acoustic and optic nerves, even leading to complete deafness and blindness," hyperpyrexia, coma, renal colic, necrosis of the liver, and hæmorrhagic exanthemata. Often no clear distinction is made between the ill effects that inevitably follow a large dose of a drug—and these are hardly *side*-effects—and those that may follow an ordinary dose.

In spite of these defects the book contains much useful information about some drugs. If in future editions all the sections are brought up to the standard of the best, the book will be a useful work of reference.

Annual Review of Microbiology

Vol. 6. Editor: CHARLES E. CLIFTON. Stanford, California: Annual Reviews. 1952. Pp. 492. $6.

IF we have complained of previous issues of this established annual it has been because so much of their contents has been of specialised interest. The volume for 1952 contains a majority of reviews which all bacteriologists may read with profit and a few which will interest any member of the medical profession. Once a year is not too often for all of us to brush up our knowledge of antibiotics.

Sigel's chapter on the influence of age on susceptibility to virus infections is not light reading, but most pædiatricians will find it full of suggestive observations. Rickettsial infections and toxoplasmosis have received attention in many parts of the world in the years since the war, and it is useful to have all this work sorted and put in a readable form; and the same is true of Burnet's discussion of virus/red-cell reactions. But we hope that it is not mere jingoism which causes us to give the palm among all the distinguished contributors to Andrewes's scholarly review of the problems of naming the viruses—or not naming them. If the standard of this volume is maintained we shall look forward to future issues.

Das Inselsystem des Pankreas

HELMUT FERNER, professor, Anatomical Institute, Hamburg University. Stuttgart: Thieme. 1952. Pp. 174. D.M. 29·70.

Professor Ferner, head of the department of anatomy at Hamburg, here collects in one volume the results of many years' detailed work on the embryology, comparative anatomy, and histology of the pancreas, particularly in relation to the problems of diabetes.

He has mainly favoured the Gros-Schultze silver method, which can be used only on frozen or celloidin sections, to differentiate the α, β, and D cells of the islets of Langerhans. He claims the β : α cell ratio determined on sections so stained is characteristically depressed in diabetes, but his hypotheses take him much further. He believes, for instance, that the α cells which stain with silver are precursors of β cells, in spite of the fact that mitotic figures in differentiated β cells may be found in suitable preparations. Further, he thinks that the anterior pituitary secretes an *alphacytotrope Faktor*; but his evidence for this does not bear scrutiny. He also develops an interesting suggestion that juvenile diabetes may be due to a maturation arrest of the transformation of α to β cells, and cites as evidence the absolute increase of α cells as well as the low β : α cell ratio in many young diabetics.

The book is illustrated by wonderfully detailed drawings of histological preparations, but sceptical pathologists might have preferred a greater proportion of objective photomicrographs. There are particularly beautiful illustrations of the blood-supply to the islets of Langerhans.

Allergy and Seborrhœa

J. AVIT SCOTT, M.D., Licencié en Droit (Université de Lille). London: H. K. Lewis. 1952. Pp. 100. 12*s*. 6*d*.

Dr. Scott has attempted the impossible task of comparing a pathological conception of uncertain clinical significance with a group of clinical conditions of vague pathology. His disarmingly modest introduction and much of his material suggest that he has written for the beginner—who, however, is more likely to be dismayed than fortified by the greater part of the text. It offers difficult and in places exasperating reading even for the dermatologist familiar with the French models upon which it is largely based.

A Textbook of Pharmacology

WILLIAM T. SALTER, M.D., professor of pharmacology, Yale University School of Medicine. Philadelphia and London: W. B. Saunders. 1952. Pp. 1240. 75*s*.

THIS book helps to bridge the gap between human physiology and clinical pharmacology. Professor Salter has been no more successful than other authors in his classification of the subject matter, but pharmacology when presented for the instruction of medical practitioners is necessarily heterogeneous. His book has the merit of consistency—not a conspicuous virtue in textbooks written by numerous contributors.

The pleasantly informal style recalls an American statesman's fireside chat; the sections are embellished with appropriate introductory quotations from the poets; and the reader's interest is sustained by clinical reminiscences. American idiom abounds, and for the British reader this characteristic in itself makes the book delightful. Professor Salter has an enviable capacity for incorporating the gist of original publications into the text without destroying the sequence of his narrative. Long lists of references are appended to every chapter, but only a selection of these receive attention in the text. The inclusion here and there of short paragraphs on unsolved problems is a stimulating innovation; and the synopses—running to about 200 words—at the end of each chapter will be a godsend to many students and practitioners. The writer's views are conventional rather than critical; he prefers the time-honoured to the sceptical approach.

The book is sufficiently comprehensive for both the clinical student and the medical practitioner. It might have been more concise and factual, but only at the risk of destroying its attractive flavour.

Hypnosis in Medicine

A. PHILIP MAGONET, B.SC., M.D., president, Medical Hypnosis Association. London: Heinemann Medical Books. 1952. Pp. 104. 9*s*. 6*d*.

Dr. Magonet's purpose in writing this account of the technique and possibilities of hypnosis is to encourage doctors and medical students to explore the subject for themselves. But his terminology and dogmatic approach are more likely to be acceptable to the layman. The prejudice against the use of hypnosis in medical practice, which undoubtedly exists and to which he frequently refers, is unlikely to be broken down by publishing successes and forgetting failures, for the medical reader is trained not to receive suggestion but to consider evidence. Hypnosis is in fact already part of the armamentarium of most psychotherapists and there seems little to justify the suggestion that it should be separated from psychotherapy as a whole.

After a brief description of the early history of hypnosis Dr. Magonet describes his own technique, and then devotes the bulk of his book to cases successfully treated. An interesting account of the use of hypnosis in childbirth and in different kinds of insomnia gives an insight into the way in which an experienced hypnotist approaches his subject. As an enthusiast for this method of treatment, Dr. Magonet feels that the regrettable attitude of the medical profession towards such pioneers as Braid and Elliotson still persists and that hypnosis is still suspect as a field for charlatanry and morbid interest. One can at least agree that "employed in a scientific way in accordance with well-established principles" its usefulness may increase.

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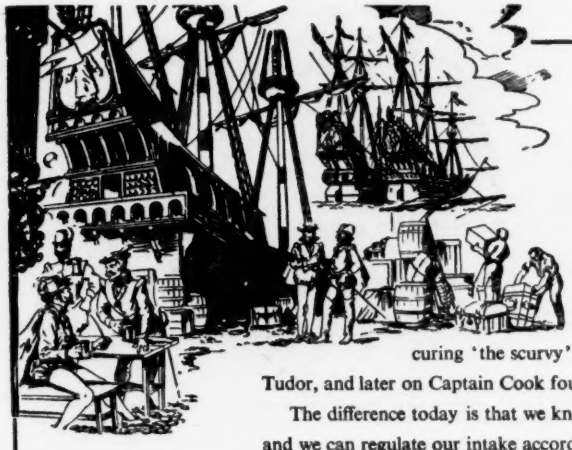

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THE LANCET

LONDON: SATURDAY, FEB. 14, 1953

Leukæmia

LEUKÆMIA, like cancer of the lung, is steadily rising in the table of the causes of death, but—unlike cancer of the lung—it affects all ages, particularly children in the first decade of life and adults after the age of 50. SACKS and SEEMAN [1] point out that the crude death-rate from leukæmia in the U.S.A. rose from 1·0 per 100,000 population in 1900 to 4·3 in 1944, the rate of increase being greatest in the last 14 years of this period. In the U.S.A. in 1942 more people died from leukæmia than from smallpox, meningococcal meningitis, scarlet fever, poliomyelitis, malaria, typhoid fever, and diphtheria combined; each year since 1940 more than 5000 persons have died from this cause. The increase is of peculiar interest to radiologists, since MARCH [2] has shown that, over a 20-year period, this disease is nine times more prevalent in these workers than in the general population. The choice by C. C. STURGIS [3] of the leukæmia problem as the subject of his Minot memorial lecture was therefore timely.

FURTH,[4] who has had as much experience as anyone of animal leukæmia, regards this as a neoplastic disease. "The essential change in leukæmia," he says, "resides in the leukæmic cell and consists of an acquired inability of immature leucocytes to respond to forces normally regulating their proliferation and maturation. This change is essentially that termed neoplastic; the end result is a new type of cell with a wide range of fixed abnormalities as concerns behaviour and appearance." So far as fowl and rodent leukæmias are concerned, there seems to be no doubt about these conclusions. But clinicians are not so sure about the disease in man, and their hesitation has been reinforced by experimental work with human leukæmia: for example, ISRAËLS,[5] whose findings were confirmed by HOOGSTRATEN,[6] showed that human leukæmic cells had not necessarily a fixed behaviour and could mature; and attempts to transmit leukæmia in man have failed. STURGIS remarks that most clinicians have reached two conclusions: firstly, that the ætiology of leukæmia is still uncertain; and secondly, that the balance of evidence at present favours the neoplastic theory. In practice treatment and prognosis are based on this theory.

One feature that has emerged from the animal work is the importance of heredity; susceptibility to "take" a transmitted leukæmia is definitely inherited, and highly susceptible families of mice have been bred. The present view is that the time of appearance and the type of leukæmia depend on interactions of genetic and extrinsic factors. At one time viruses seemed to be responsible for the transmission of leukæmia, but in mice, according to KIRSCHBAUM,[7] virus is not an ætiological agent; it is harboured by the cells of some leukæmic strains and causes an illness which hastens death from leukæmia, and it may alter the antigenicity of the leukæmic cells or the immune reactions of the host. In man familial prevalence is rare; but VIDEBAEK's records from Denmark suggest that there may be some leukæmic families.[8] Another important observation is that of the effect of ionising radiations, such as X rays or those from atomic disintegration. It is well known that leukæmia can be induced in animals by exposure to X rays; we have already mentioned the increased incidence among radiologists; and STURGIS recalls that in people exposed to the atom-bomb explosions in Japan leukæmia developed ten to twenty times as commonly as among the general population.

These findings have not taken us far towards understanding the ætiology of leukæmia. Our ignorance is reflected in the multiplicity of treatments. These are, at present, blood-transfusions, antibiotics, arsenic, X rays, radioactive phosphorus (P^{32}), urethane, the nitrogen-mustard group, folic-acid antagonists, and corticotropin (A.C.T.H.) and cortisone. Blood-transfusion is still much used, especially for temporarily rescuing the patient so that other treatments can be given. Exsanguination followed by replacement-transfusion was tried, but has been dropped; the results were not noticeably better than with a series of ordinary transfusions. Antibiotics have been very useful in controlling infections, especially of the mouth, but they are thought to have no other action. Arsenic, Fowler's solution, was the first of the cellular poisons used against leukæmia, but is now rarely given. Many workers prefer X rays to other forms of treatment; and STURGIS believes that they are still the best remedy for chronic lymphatic leukæmia. It is uncertain whether the radiation should be applied locally to the enlarged spleen or lymph-glands or to the whole body by the so-called "spray" technique. OSGOOD's [9] results suggest that the spray method is preferable. STURGIS prefers localised application for lymphatic leukæmia. He agrees that for myeloid leukæmia the spray technique is the better; but he holds that for chronic myeloid leukæmia radiation by radiophosphorus is the best treatment. LAWRENCE and his co-workers [10] found that in myeloid leukæmia radiophosphorus prolonged freedom from discomfort, but it did not

1. Sacks, M. S., Seeman, I. *Blood*, 1947, **2**, 1.
2. March, H. C. *Amer. J. med. Sci.* 1950, **220**, 282.
3. Sturgis, C. C. *J. Amer. med. Ass.* 1952, **150**, 1551.
4. Furth, J. *Blood*, 1951, **6**, 964.
5. Israëls, M. C. G. *J. Path. Bact.* 1940, **51**, 235.
6. Hoogstraten, J. Cited by L. E. H. Whitby and C. J. C. Britton. Disorders of the Blood. London, 1950; p. 455.
7. Kirschbaum, A. *Cancer Res.* 1951, **11**, 741.
8. See *Lancet*, 1951, **1**, 1309.
9. Osgood, E. E. *Arch. intern. Med.* 1951, **87**, 329.
10. Lawrence, J. H., Dobson, R. L., Low-Beer, B. V. A., Brown, B. R. *J. Amer. med. Ass.* 1948, **136**, 672.

seem to increase the duration of life any further than other treatments; they also used X rays sometimes to reduce the size of the spleen. LAWRENCE [11] found that P^{32} was equally effective for chronic lymphatic leukæmia. Radiophosphorus is still not much used in this country because of difficulties of supply and handling.

Urethane was introduced in 1946 by EDITH PATERSON and her co-workers,[12] and it proved useful especially in chronic myeloid leukæmia. STURGIS thinks that experience has shown that results with urethane are inferior to those with radiation; and it is now rarely used, mainly because of the unpleasant side-effects—persistent anorexia, nausea, and even vomiting. Nitrogen mustard (mustine *B.P.*) is still much used in this country; many reports suggest that the results are as good as with X rays, and it has the advantage over later modifications that its active phase is relatively short and its effect is therefore more controllable. Its great disadvantage is that it has to be given intravenously in a running drip. Drugs of this type that can be given by mouth have been introduced.[13] PATERSON et al.[14] gave one such drug, triethylene melamine, in enteric-coated tablets, and found that its action, unlike that of most antileukæmic agents, was strongest against chronic lymphatic leukæmia. Hæmopoietic tissue is, however, very sensitive to triethylene melamine, which must never be used without proper hæmatological control. The latest of these antileukæmic drugs that can be given orally is 'Myleran,' accounts of which were given in our issue of Jan. 31 by Professor HADDOW and Mr. TIMMIS, and by Dr. GALTON. Myleran is especially interesting because chemically it is quite different from the nitrogen mustards; it is 1 : 4 dimethanesulphonyloxybutane. It is effective only in chronic myeloid leukæmia; in therapeutic doses it depresses granulocyte formation in the bone-marrow without affecting the other elements. But, like its predecessors, it is a powerful antihæmopoietic drug that in large doses can cause thrombocytopenia or even pancytopenia. Folic-acid antagonists have been used in attempts to control acute leukæmias. Some temporary remissions have been obtained with 'Aminopterin,' but the toxic effects can be severe and the results are capricious.[15 16] In acute leukæmia A.C.T.H. and cortisone have also been extensively tested. In a group of 40 cases treated, only 2 had lengthy remissions; 7 more had remissions only during treatment.[17] STURGIS points out that the favourable responses that have been recorded were mostly in children.

All this activity shows that a great effort is being made to meet the challenge of increasing leukæmia. All the methods hitherto developed need close control, and the patient's only hope of even temporary relief depends on his attending a centre equipped to deal with the disease.

11. Lawrence, J. H., Low-Beer, B. V. A., Carpender, J. W. J. *Ibid*, 1949, **140**, 585.
12. Paterson, E., Haddow, A., ApThomas, I., Watkinson, J. M. *Lancet*, 1946, ii, 677.
13. See *Ibid*, 1951, i, 1111.
14. Paterson, E., Kunkler, P. B., Walpole, A. L. *Brit. med. J.* Jan. 10, 1953, p. 59.
15. Dacie, J. V., Dresner, E., Mollin, D. L., White, J. C. *Ibid*, 1950, i, 1447.
16. Wilkinson, J. F., Gardikas, C. *Lancet*, 1951, i, 325.
17. Medical Research Council. *Brit. med. J.* 1952, i, 1261.

Pneumothorax Therapy

ENTHUSIASM for pneumothorax therapy in pulmonary tuberculosis seems to be waning [1]; but this method of treatment is unlikely to be discarded. It is a relatively simple alternative to surgical measures, which few centres can provide for all cases. Many clinicians have a certain affection for this method, which they can apply at their own discretion without seeking a surgical opinion or transferring the patient elsewhere; pneumothorax may yet prove to deserve in its own right a limited place in treatment. Meanwhile, the problem of when to terminate a pneumothorax is still with us.

In an attempt to solve this problem HARRIS et al.[2] analysed the records at the Edgware and Harrow chest clinics of 279 cases in which a pneumothorax had been abandoned, not because it was unsatisfactory, but because the clinician concluded that the disease had been effectively controlled. The results, therefore, reflect, not the general value of pneumothorax therapy, but its effectiveness in a selected group of patients in whom things had gone well for several years. The investigation showed that no firm criteria had prompted the decision to abandon the pneumothorax. There was no correlation between the severity of the initial disease and the duration of relaxation; and whereas some lungs which initially showed only infiltration were kept collapsed for five or more years, others with cavitating lesions were allowed to re-expand in less than three years. Some physicians terminated a pneumothorax only when refills became too difficult, others when the pneumothorax had been present for five years, and still others on radiological evidence. Many clinicians took part in maintaining the pneumothoraces, and no common plan of action could be detected. A surprisingly high proportion (46·6%) were badly maintained; and with these the end-results were only half as good as with those which were well maintained, although the efficiency of maintenance was unrelated to subsequent breakdown.

HARRIS et al. correctly associate faulty maintenance with the staffing of chest clinics, and point out the necessity to keep down the number of patients at refill sessions, in order to give enough time to each patient. Another important finding is the disastrous effect of change in personnel among the clinicians. Such changes are bad enough when one skilled operator is replaced by another, but they are much worse when an inexperienced locum tenens takes over—which is what commonly happens in clinics at times of holidays or sickness. This particular hazard of pneumothorax therapy is seldom recognised. It certainly deserves attention, for the results were good in no less than 83·3% where the pneumothorax was well maintained. YOUNG,[3] also has shown that better results are achieved by a constant operator. A system of staffing chest clinics with registrars who are continually changing, often with intervals necessitating the employment of a locum tenens, is clearly not desirable.

The investigation emphasises the need for a rational policy with regard to the duration of pneumothorax

1. Simmonds, F. A. H., Laird, R., Macdonald, N. *Lancet*, 1952, ii, 347.
2. Harris, W. C., Poles, F. C., Anderson, A. W. *Quart. J. Med.* 1952, **21**, 447.
3. Young, F. H. *Proc. R. Soc. Med.* 1949, **42**, 244.

therapy; by pruning out those cases where refills are being maintained unnecessarily long, needless hazards can be avoided, and more time can be devoted to the remainder. HARRIS et al. suggest that nothing is to be gained by maintaining an artificial pneumothorax for more than three years. This positive statement in a field where the weeds of evasiveness have flourished abundantly for too long can at least be tested by therapeutic trial. Their estimate, which agrees broadly with the findings of MITCHELL [4] in his series of 557 cases, seems unlikely to be far wide of the mark. If it were accepted, refill sessions could be reduced not only in numbers but in difficulty, since the difficult refills are commonly those in pneumothoraces of long standing; pricking of the lung, traumatic pneumothorax, and air embolism would thus become less frequent, and there would be less risk of residual respiratory disability from thickened pleura; and the patient would be saved both working time and travelling time. The results would before long indicate whether such a restriction on the duration of pneumothoraces was justified.

Hallux Valgus

HALLUX valgus is in the news again; several workers have been making further attempts to eludicate the ætiology of the condition and to assess the value of various operations. There have long been two chief contenders for the causative crown: tight, wrongly shaped shoes, and metatarsus primus varus. Undoubtedly, however, hallux valgus is found occasionally in people who have never worn shoes, and quite often in people who have always worn "sensible" shoes; and as to metatarsus primus varus, HARDY and CLAPHAM [5] conclude from an extensive survey of children aged 4–15 that "the deformity of hallux valgus *precedes* widening of the first intermetatarsal angle. A congenital widening of the first intermetatarsal angle may not be as important in hallux valgus formation as had been thought." HARDY and CLAPHAM also make interesting observations on the lateral displacement of the distal phalanx on the proximal phalanx, which might be of primary importance in initiating the deformity; and they suggest also that there is need to investigate the function of the abductor hallucis—which makes one wonder how many of us (or our children) can actively abduct our big toes from the remainder. Surveys of peoples who go barefoot may throw further light on the problem; but meanwhile there is commonly no apparent cause whatever for hallux valgus.

Conservative measures do little or nothing to halt this progressive condition, and eventually many patients undergo operations the results of which are far from satisfactory to the discriminating surgeon. BONNEY and MACNAB [6] have made a critical survey of the results of operation for hallux valgus and hallux rigidus at the Royal National Orthopædic Hospital. As usual the patients were predominantly women; and, like CLEVELAND and WINANT,[7] these workers think that this is partly explained by the greater willingness of men to wear suitable shoes. They show that in patients with a family history of this trouble symptoms appear earlier than in others. Most of their patients had increased intermetatarsal angles, and they assume that this is a primary defect. In the adolescent osteo-arthritis of the joint is not a major factor; and the various arthroplasties, all of which leave the toe somewhat weakened, are obviously far from ideal. The solution might seem to be to do an osteotomy at the base of the first metatarsal; but BONNEY and MACNAB list many causes of failure. It is remarkable that "in 34 of the 54 feet operated upon the metatarsus primus varus returned to its original state or to a larger angle than before operation after intervals varying between one day and three months after operation." The main technical difficulty after osteotomy is to maintain the correction, and in some cases a screw was passed through the neck of the first metatarsal into that of the second, to maintain the position. (BONNEY and MACNAB do not mention the simple and satisfactory method by which a suture is passed around the two metatarsal necks.) Even theoretically, however, a metatarsal osteotomy is not fully satisfactory; it would seem that one should either correct the hallux valgus itself at the same time by the appropriate soft-part operation, or, accepting the deformity at the joint as permanent and best for future joint function, do a double osteotomy—one at the base to correct the metatarsus varus, and one at the neck angled in the reverse direction to correct the hallux valgus. A double osteotomy can in fact give very satisfactory results. In adults the theoretical advantages of the single osteotomy have not been confirmed in practice; and BONNEY and MACNAB point out that this operation "involves placing the articular surface of the first phalanx in relation to an area of the metatarsal head which through long continued subluxation is usually denuded of cartilage"—which is of course the reason for doing a double osteotomy. They conclude that with the single osteotomy the results had been unsatisfactory because of imperfect technique and inadequate selection of patients. Like others, they found that the arthroplasties of KELLER and MAYO often gave a good result; but sometimes it was unsatisfactory, and they investigated possible causes of this—including selection of cases, operative technique, and after-treatment—without finding any clear lead. They confirm LLOYD'S [8] finding that the functional result was equally good with either form of arthroplasty.

There are of course other procedures, and ROSS SMITH [9] commends arthrodesis of the first metatarsophalangeal joint in 30° of dorsiflexion. Immobilisation must, however, be continued for a long time; and his results are no better than those in the best arthroplasty series. No matter what method is used there is still an unpleasantly high proportion of failures either from recurrent deformity and pain, or from interference with the function of the foot as a whole causing metatarsalgia or other troubles. BONNEY and MACNAB rather gloomily remark that no operation on the hallux valgus will enable the patient with a very broad foot to wear ordinary shoes; "in such a case it is probably wiser and more

4. Mitchell, R. S. *Amer. Rev. Tubere.* 1951, **64**, 151.
5. Hardy, R. H., Clapham, J. C. R. *Lancet*, 1952, i, 1180.
6. Bonney, G., Macnab, I. *J. Bone Jt Surg.* 1952, **34B**, 366.
7. Cleveland, M., Winant, E. M. *Ibid*, 1950, **32A**, 163.
8. Lloyd, E. I. *Brit. J. Surg.* 1936, **24**, 341.
9. Ross Smith, N. *Lancet*, 1952, ii, 1385.

economical to avoid operation and to provide surgical shoes." Each year roughly 40,000 pairs of surgical footwear are provided through the National Health Service; a considerable number of these must be for the broad foot with hallux valgus; so there still seems to be good cause for research into its origin and treatment.

Annotations

FOG AND FALLACY

OF our trilogy of reports on the recent London fog (concluded with Dr. Logan's paper on p. 336) one was from Dr. John Fry, who on Jan. 31 described the effect of the fog on his Beckenham practice. In our correspondence columns this week a Durham colleague, Dr. Frank Cort, expresses surprise at the relatively small number of extra visits Dr. Fry was called upon to make, compared with his own experience during "a similar occurrence" two or three years ago. From this he goes on to point out that the number of visits and attendances per patient per annum is about three times higher in his own practice than it is in Dr. Fry's, and that his remuneration per item of service is accordingly about three times less. We are glad to print this letter, together with a rejoinder from Dr. Fry, because it gives us an opportunity to say, most emphatically, that the value of a practitioner's work cannot and must not be judged by counting his items of service. To think in terms of *quantity* is the ever-present temptation of the administrator; but doctors should know better.

The truth is that there are many different ways of conducting a general practice efficiently, and practitioners vary widely in their opinion about the frequency with which they need to see their patients. Dr. Fry's figures suggest that the people on his list are seen by him a little less frequently than the average. Dr. Cort, on the other hand, prefers to give his Northern patients more than twice as many items of service as are nationally usual. But such variations are almost no indication of a practitioner's usefulness to the community: indeed they can be interpreted in either direction, according to taste. One doctor, by giving his patients ample time when he does see them, by instructing them in simple health and preventive measures, by encouraging their self-reliance, and by discouraging frivolous calls, may keep down the number of items of service asked of him while still providing care that fully satisfies those in his charge. Another may find that he likes to give, and that his patients expect and prefer, much more frequent attention. Additional factors that may play their part include the differing morbidity in different types of area, and the geographical features and social custom of the district (both of which profoundly affect the frequency of attendance, and the ratio between visits and surgery attendances).

The importance of Dr. Fry's figures for the fog lies not in their comparison with other practices but in the variations they reveal in his own practice. Dr. Fry has achieved a certain pattern of practice which satisfies him and his patients (for he has built and holds a large practice in an area where the average practice is not large). With the figures he has carefully kept, he is able to predict the calls his patients are likely to make on him at different seasons of the year. Here in a particular week he finds that he was called upon to give much more than double the number of attendances to patients suffering from respiratory disorders, and affections of the upper respiratory tract, than were needed for the patients of the same practice a fortnight earlier, before the fog descended. He has reported this significant fact. Similar valuable information, often known to general practitioners but rarely recorded, may well come to light if the College of General Practitioners pursues one of its declared aims—"the encouragement of accurate observation, investigation, and recording of results by general practitioners."

HYALURONIDASE AND URINARY STONES

LAST year [1] we remarked on the promising possibilitie of hyaluronidase as a means of preventing or at least curbing the formation of urinary calculi: there is now more news of this interesting subject. The story really began in 1950 when Butt [2] observed that subcutaneous injections of hyaluronidase mixed with isotonic saline solution could produce a much clearer urine in patients who had previously been passing a turbid urine containing much sediment. The hyaluronidase worked, it was suggested, by increasing the colloid content of the urine, and so preventing crystals from forming and growing. Indeed, Butt and Hauser [3] were able to give visual proof that an injection of hyaluronidase was followed by the release of protective colloid in the urine, which not only dispersed crystals already there but inhibited the formation and growth of new ones. But the addition of hyaluronidase to urine after it had been passed did not increase its colloid content; so the suggestion was made [4] that hyaluronidase acted indirectly by releasing hyaluronate at the site of injection and that hyaluronate was excreted in the urine during the period of restoration of hyaluronate at the site of injection. Butt and his colleagues have since shown that potassium hyaluronate is a powerful dispersing agent: the evidence suggests, then, that a hyaluronidase substrate is a part of normal urine and that it has much to do with regulating the colloid-crystalloid balance; some disturbance in this balance has for long been blamed rather vaguely for the formation of urinary calculi.

Butt et al.[5] have now carried their clinical experiments a stage further. Before giving hyaluronidase to a patient troubled by recurrent stones, they determined the level of protective colloids in his urine by ultramicroscopic examination and photography, by measurements of surface tension, or by sediment and turbidity tests. They then found that in most patients with uninfected urine an injection of 150–300 turbidity-reducing units (T.R.U.) of hyaluronidase every 24 or 48 hours produced a considerable increase in protective urinary colloids. In the presence of infection much larger doses were needed—often between 300 and 900 T.R.U. and occasionally as much as 2400 T.R.U. daily. In this way they were able to suggest a suitable dose for each patient and to control the treatment as it proceeded. Indeed, the one discouraging feature of this work is the need to estimate rather carefully the adequate dose for a particular patient; for if too small a dose is given, the colloid-crystalloid balance may be tipped the wrong way by sensitisation, and crystals may be deposited rather than dispersed. Butt et al. do not sound completely happy about this important point, and they are hard at work trying to get to the bottom of it; but if the results they have achieved so far are anything to go by, this question of estimating dosage is not going to prove very troublesome, and, moreover, there is no need to worry about giving too much, for large doses of hyaluronidase have no ill effects.

Twenty-four patients, who had been forming stones with depressing regularity and for no clear metabolic reason, have been under treatment for from 11 to 21 months. All other attempts to subdue the calculi had failed, but in nineteen of these patients no new stones have formed

1. *Lancet*, 1952, i, 1198.
2. Butt, A. J. *J. Florida med. Ass.* 1951, **37**, 711; *J. Urol.* 1952, **67**, 450.
3. Butt, A. J., Hauser, E. A. *Science*, 1952, **115**, 308; *New Engl. J. Med.* 1952, **246**, 604.
4. Butt, A. J., Hauser, E. A., Seifter, J., Perry, J. Q. *Sth. med. J.* 1952, **45**, 381.
5. Butt, A. J., Hauser, E. A., Seifter, J. *J. Amer. med. Ass.* 1952, **150**, 1096.

during the hyaluronidase period, and in four of them existing stones have become smaller and less dense radiologically. At least some of the five failures, it seems, may have been caused by incorrect administration of the drug. During the experiment no other form of treatment was used. Most patients had an injection every 24–48 hours; and Butt et al. point out that the site of injection should be changed so that the same area is not injected more often than once in 4 days. Frequent injections are clearly a drawback; but if they can really help a patient threatened by recurrent stones, then he will accept the irksome routine as cheerfully as most diabetics do.

TREATMENT OF SLEEP PARALYSIS

SLEEP paralysis is a rather rare disorder of the normal change of consciousness from waking to sleeping or sleeping to waking. It seems to be rather commoner on waking than on falling asleep, although the so-called night-nurse's paralysis may possibly be predormitial sleep paralysis. Those who experience this disorder say that they are quite conscious and their sensory powers are complete, but they are unable to move or speak. This rather frightening state may last for as long as ten minutes. Sometimes sleep paralysis is associated with narcolepsy.[1]

Our understanding of sleep itself makes little headway. Some attribute sleep to general cortical processes, and others to the special action of a localised area of the posterior hypothalamus which is variously regarded as a waking centre, a sleep centre, or even a combination of these two. Narcolepsy and hypersomnia arise in association with many different organic conditions of the brain, but structural involvement of the hypothalamic region is generally regarded as the commonest cause. This does not necessarily prove, however, that we owe ordinary sleep to the hypothalamus; for the sleep of narcolepsy and of hypersomnia may differ from the physiological form.

Weitzner,[2] who has successfully treated sleep paralysis by insulin hypoglycæmia, obviously has no doubt that it is the hypothalamus—be it sleep or waking centre—that is involved in this syndrome; he asserts that insulin hypoglycæmia increases the power of the hypothalamus to regulate sleep, and he recalls that usually one of the first benefits that patients with rheumatoid arthritis derive from treatment by insulin hypoglycæmia is a relaxed and uninterrupted night's sleep. Weitzner's ideas will perhaps not be accepted by all; but his findings may form a useful basis for further observations.

A SUBSTITUTE FOR LYSOL

OF the disinfectant compounds derived from the distillation of coal-tar at rising temperatures, phenol has the lowest boiling-point and is most highly destructive to tissue. It is followed by the cresols, which are much more bactericidal and rather less toxic; being less soluble, they are put up in solution in soap. Lysol, which is a 50% solution of cresols, has a wide range of activity on bacteria and fungi, and has long been popular as an economical disinfectant for general use. It has the disadvantage, however, that its bactericidal value varies with the different oils and fatty acids which may be used in its preparation. Furthermore, it has an irritant or even necrotic action on the skin. Leonard Colebrook, who observed this with concentrations necessary to destroy the hæmolytic streptococcus, condemned lysol for midwifery and suggested that chloroxylenols should be used; these, however, have only a limited action on staphylococci and *Pseudomonas pyocyanea*, and they lose much of their value when organic matter is present.

The skin irritation from lysol is due to the cresols contained in it; and refractionation of the higher phenolic homologues will yield a fraction or "cut" which contains no cresols but is close enough to them to give, when formulated, a disinfectant with most of the desirable qualities of lysol and, in effective concentrations, no damaging action on the skin. The properties of a material of this sort, marketed as 'Sudol,' have been investigated by Finch.[1] It contains 50% of phenols, and a blend of vegetable fatty oils is used as the basis of the soap. It forms a clear solution with distilled water and gives a slight opalescence without scum in tap-water. Its activity against seven representative bacterial species—mainly pyogenic and intestinal organisms—was compared with that of carbolic acid in Rideal-Walker and Chick-Martin tests, and with lysol and the solution of chloroxylenol *B.P.* in modified tests with and without organic matter.

We have already noted the serious limitations of these tests.[2] The comparative figures reported by Finch seem, however, to show clearly the greater bactericidal effect of the lysol substitute, and its greater activity against non-sporing organisms in the presence of organic matter, especially when compared with chloroxylenol solution. In working concentrations, and even for a few minutes undiluted, it does not burn the hands. Further work will no doubt be done to assess its value as a skin disinfectant, and, diluted with equal parts of water, for such purposes as the sterilisation of instruments and baths. The fraction has no doubt been carefully selected to exclude the known carcinogenic components of the distillates. This precaution has to be kept clearly in mind in the search for better disinfectants among the higher "cuts."

THE RESURGENT STREPTOCOCCUS

IN the past two decades the outstanding successes of chemotherapy against bacterial infections have perhaps lulled us into a false sense of security. On an earlier page of this issue will be found an account by Dr. Gibson and Dr. Calman of an outbreak which shows us that the hæmolytic streptococcus has not lost its sting.

Between Nov. 1, 1952, and Jan. 3, 1953, the laboratory at Queen Charlotte's Hospital received 38 swabs from which group-A β-hæmolytic streptococcus was isolated. It was found that 26 of the strains isolated belonged to serological type 13 (3/B3264): of these, 1 came from a throat-swab and 13 from vaginal swabs of patients, 11 were from throat-swabs of nurses and orderlies, and 1 was from ward dust. The first recognised case of streptococcal infection was in November, 1952, when a nurse complained of sore throat. She was sent off duty until her "throat was clear." A fortnight later a baby developed erysipelas, and although this baby was immediately transferred to another hospital streptococcal infection appeared sporadically in patients and staff. At first all the cases were in one ward, but later cases occurred in wards on other floors. By last month it was evident that the epidemic type of β-hæmolytic streptococcus (type 13) had become well established. In 11 out of 14 infected patients the illness was mild; the other 3, however, were acutely and seriously ill with temperatures of up to 105°F with rigors. Of 3 later cases 1 was mild, 1 was the most severe genital-tract infection of the whole outbreak, and 1 was a streptococcal meningitis in an infant who was critically ill.

Dr. Gibson and Dr. Calman emphasise that "this outbreak of puerperal infection was far larger than anything experienced in recent years." They give reasons for thinking that it was not due either to relaxation of antiseptic methods (which have not been changed in the last five years), or to an increased infection-rate in the surrounding population. They are inclined to think that the great increase in the number of cases and the severity of some of them may herald an increase in the patho-

1. Levin, M. *J. Neurol. Psychopath.* 1933, **14**, 1.
2. Weitzner, H. A. *Arch. Neurol. Psychiat.* 1952, **68**, 835.

1. Finch, W. E. *Pharm. J.* 1953, **170**, 59.
2. *Lancet*, 1951, ii, 575.

genicity of the hæmolytic streptococcus. Be that as it may, the epidemic illustrates the difficulty of effectively controlling the spread of streptococcal infection while continuing to admit patients. Undoubtedly one reason is that the causal organism remains viable in dust for a long time and may defy disinfection with formaldehyde or other chemicals. Dust is likely to be especially dangerous if it is being continuously reinfected from a reservoir of streptococci; and the work of Hamburger and others [1 2] has shown that often a heavy nasal carrier of β-hæmolytic streptococci can be found, and that fresh cases cease when this reservoir is removed. Meanwhile, Dr. Gibson and Dr. Calman are right to warn those responsible for maternity units against the possibility of similar severe puerperal infections.

LIVING WITH CANCER

Mrs. Edna Kaehele, who has had inoperable cancer for six years, has written a remarkable little book about living with this disease.[3] The dust-jacket asserts plainly that the title "does not mean that you can survive for longer than you thought when you have cancer: but that, in spite of having cancer, you can live life abundantly." Mrs. Kaehele herself, however, has survived for longer than she thought; and believes it has been, in some part at least, a spiritual victory. Her story has a special interest, because it may throw some fresh light on the natural history of this disease. Most patients who are beyond successful treatment die, as it were, before they have time to rally. Mrs. Kaehele failed to die at the appointed time; and she has rallied. Perhaps her cancer would have regressed in any case, as a few do; but she certainly passed and survived a point at which most patients would have died, and that in itself is interesting.

The growth was beyond operation when diagnosed in July, 1946; and by Dec. 3 she had received "fifty-six X-ray treatments, the radium operation, radon implants, as well as biweekly injections of liver extract and countless shots of vitamins to replace the ones destroyed by radiation." She did not feel as though she had profited from this exhausting course of treatment—though it may, in fact, have slowed the rate of growth of the tumour, and given her body time to manœuvre. Her weight had gone down from well over 10 st. to less than 7 st. and she had much pain, and hardly strength enough to stand. She was given a blood-transfusion and sent home on the understanding that she would be dead before the New Year. That she did not fulfil this engagement she attributes largely to the determination of her family, and especially of one sister. On Jan. 17, 1947, as she was still alive, a course of radium chloride therapy was begun. "It was tasteless and painless, and when the series was finished seemed to have been useless as well." However, if not gaining she was losing ground more slowly, and in February she was given another transfusion, and received two more in the course of the following months. In July, a year from the date of diagnosis, she began a second course of radium chloride treatment, and after that her doctors were at the end of their resources.

So much for the medical delaying tactics; she does not underrate their value. "I beg you," she says to her readers with cancer, "to search out the best cancer specialist you can find and to make full use of the most advanced resources available."

Nevertheless for a long time after her treatment ended she remained very ill, and her weight, though she had stopped losing it, remained at 6–7 st. She considers she was greatly supported, however, by the general determination that she should live and by her own strong religious faith. She was bedridden for a long time, and for several months food "was not only unwelcome but became unbearable." Her family kept her going by adding gelatin to her coffee, and by persuading, bullying, and nagging. Then came a turning-point, surely of much clinical interest, when she began to eat ravenously, as though the body so recently rebelling against food was now "crying out in starved desperation." Her weight began to rise, and by the autumn of 1947 she was beginning to come "back to life." By Christmas she was going out again and doing her own shopping. It was an emotional as well as a physical reorientation, and she naturally writes of it with emotion.

She has put on 2 st. in weight, and is now engaged in breeding dogs. She needs hardly any medication for pain, which is much less insistent. To others with cancer she offers two useful pieces of advice: have faith in "your doctor, your God, yourself—faith in *something*"; and eat well, "stuff the body with protein to rebuild the ravaged tissues and saturate it with vitamins to revitalise it." On the subject of pain she is reassuring: "I must have suffered just about all that one suffers from death by cancer, and I wish to shout it from the housetops that my greatest agony was in waiting expectantly twenty-four hours a day for the unbearable pain I confidently expected to begin any minute."

Her message to doctors is probably equally well chosen. If we kill the patient's hope stone dead by inviting him to die at a given time, die he probably will, at the appointed moment, out of a combination of despair and good manners. She also writes feelingly of the American patient who delays coming for treatment until too late solely because of the expense. The National Health Service has surely done a good thing in removing this cause of death from our statistics.

1. Hamburger, M. jun., Hamburger, V. G. *J. infect. Dis.* 1945, 77, 68, 96.
2. Cook, G. T., Munro-Ashman, D. *Brit. med. J.* 1949, i, 345.
3. Living with Cancer. London: Gollancz. 1953. Pp. 160. 8s. 6d.

STUDENT HEALTH SERVICES

In fact and tradition, students seldom have the means or indeed the inclination to provide themselves with good food and lodgings, and for one reason or another they are often slow to seek medical advice. Theoretically, the National Health Service has overcome the student's difficulty of finding the money to meet ill health; but, as the Social and Preventive Medicine Committee of the Royal College of Physicians points out in a progress report on Student Health Services published last month, this solution does not always work out in practice. A student is often not registered with a doctor in the university town because his home is elsewhere; and the National Health Service does not provide for the regular examinations which the committee recommended in 1946 [1] and which are now required by many universities and colleges. To overcome these difficulties, the committee would like to see more general practitioners fitted into the organisation of student health services, not only to help the student when he is ill in his "digs" but to take on the wider rôle of adviser in health.

Looking back on the development of student health services since 1946, the committee finds that the position in the universities outside London, with the notable exception of Oxford, is now largely in agreement with their earlier recommendations in the matters of medical and nursing care, lodgings, and food. In Oxford certain colleges have their own arrangements, which in some cases amount to an organised health service, but the university recently set aside a proposal for a service covering the student population as a whole. The situation in London is unsatisfactory, particularly for the non-medical students. Nearly all the medical schools insist on regular X-ray examinations, and students can always obtain advice and treatment from members of the hospital staff; but their colleagues in other faculties are often poorly provided for. True, University College has an excellent scheme run by its student health association, to which the Royal Veterinary College and the London School of Hygiene and Tropical Medicine are affiliated; and Imperial College is also well equipped to look after its students. But the other non-medical schools and colleges, with a student population of 6000, have done little to follow the committee's advice. Most of them

1. See *Lancet*, 1946, i, 241.

make use of mass-radiography units, and some have part-time nurses, but other provisions are scanty or non-existent. The colleges which seem reluctant to act justify this situation by saying that there is no demand from the students themselves for anything better or that there is no need for any arrangement outside the National Health Service. One reason for this inactivity has certainly been the absence of any financial provision for student health in the previous five-yearly estimates, and the committee hopes that allowance has been made in the 1952–57 estimates. Moreover, the lack of progress in London may be partly due to the separation of the medical schools from the other schools and colleges: as the committee points out, where this separation is slight —at University College—the students have a first-class health service.

The extension of student health services has also been urged in the past by the Goodenough Committee, by the several conferences on student health held since the war by the Nuffield Provincial Hospitals Trust, and by the students themselves through the National Union of Students and the British Medical Students Association and in other ways. And clearly much has been done in response. But it is surprising that in so many of the London colleges these authoritative opinions have been largely disregarded. If the reason is financial, the answer is that it is false economy to save money at the expense of health; if it is one of principle—based on the claim that a responsibility no longer exists—then the committee of the Royal College of Physicians has pointed clearly to the fallacy.

SUBACUTE INCLUSION ENCEPHALITIS

CONSIDERABLE progress has been made in the differentiation of a number of types of virus encephalitis, which, both clinically and pathologically, falls into fairly well-defined groups. Apart from those following vaccination and infections such as measles, influenza, and mumps, Greenfield [1] recognised four main divisions:

(1) Acute polioclastic encephalitis, where an acute inflammation affects mainly the grey matter.
(2) Acute hæmorrhagic leuco-encephalitis, where lesions are primarily in the white matter.
(3) Subacute sclerosing encephalitis.
(4) Subacute inclusion-body encephalitis.

To these may be added acute encephalitis due to infection by the herpes simplex virus and those rare cases of encephalitis associated with generalised cytomegalic inclusion disease of children.

Subacute inclusion encephalitis was first described in 1933 when Dawson [2] recorded the case of a 16-year-old boy who died after 7 weeks' illness characterised by involuntary jerking movements and finally by lead-pipe rigidity of the limbs, loss of self-control, and hallucinations. At necropsy eosinophilic inclusion bodies were found in both the nuclei and cytoplasm of degenerate nerve-cells and astrocytes in areas of the brain showing the usual histological picture of encephalitis. He called the disease "inclusion encephalitis" and suggested that a virus was responsible, though none could be isolated. So far 16 similar cases have been recorded, 9 of them in this country [3 4]; and from them a clinical pattern can be made out. All the patients were between the ages of 4 and 17, and only 2 were over 11. The majority of fatal cases ran a course of from 3 to 9 months, although some survived for as long as 21 months. Brain et al.,[3] who described the first 4 cases in this country, emphasised that the disease got steadily worse over a number of weeks. Psychological changes were usually the first to be noted; deterioration of school work, apathy, forgetfulness, lack of emotion, indifference, and intellectual impairment were commonly found in the early stages. Less often the children showed from the start more definite signs, such as muscular twitching, limping, or a tendency to stumble. Sooner or later, persistent or intermittent muscular spasms appeared, and progressive paralysis followed, leading to severe quadriplegia associated with complete dementia and cachexia. The cerebrospinal fluid either remained normal throughout or showed a Lange reaction of paretic type. Campbell et al.[4] consider that the clinical picture is so striking that it is unlikely to have been missed by neurologists in the past, and they therefore believe that it represents a new clinical entity. They observed 2 children who had the clinical features of subacute encephalitis but who later recovered, and they believe that, as the condition becomes more widely recognised, the prognosis may prove to be more hopeful.

The inclusion bodies accompanying the inflammatory changes in the brain are commonest in nerve-cells, although neuroglial cells may be affected to a less degree. Intranuclear inclusions are usually single and large, and stain with eosin and phloxine; they often fill the nucleus leaving only a few granules of chromatin on the nuclear membrane. The single intranuclear inclusions are probably formed by the coalescence of a number of smaller bodies, for multiple inclusions are sometimes found in the nuclei of less degenerate cells. The cytoplasmic inclusions are multiple, and they are smaller and more strongly eosinophilic than those within the nuclei, but these too may fuse to form a single body sometimes replacing the entire cytoplasm. Ultimately the cell degenerates and shrinks, and is finally represented by a mass of inclusion material. These cells are easily distinguished from the inclusion cells of both herpes-simplex encephalitis and cytomegalic inclusion disease.

Perivascular infiltration with inflammatory cells and gliosis are widespread in the grey matter of the cerebral cortex, basal ganglia, and brain-stem, and may even extend into the dorsal and ventral horns of the cervical cord. The changes in the white matter seem to be secondary to damage to the nerve-cells or to local extension of the inflammation into the subcortical tissue. Virological examinations have been performed in 8 cases, but no virus has yet been isolated. The same applies to cytomegalic inclusion disease, which is almost certainly due to a species-specific virus; and it is probable that the virus responsible for subacute inclusion encephalitis is pathogenic to man only.

A condition with the same clinical picture as that found in subacute inclusion encephalitis was described in 1945 by van Bogaert.[5] In both his cases the brain showed extensive focal inflammation affecting the grey and white matter at least equally. There was partial demyelination, diffuse infiltration with plasma cells, scattered fat-granule cells, and mobilisation of microglia. The most conspicuous feature was a disproportionate neuroglial proliferation in the white matter and in the cerebral cortex. There was less evidence of damage to nerve-cells than in subacute inclusion encephalitis, and no cells containing inclusion bodies were seen. van Bogaert called the condition "subacute sclerosing leuco-encephalitis." Although Brain and his colleagues considered that this leuco-encephalitis was distinct from Dawson's encephalitis, Greenfield pointed out that the two diseases differ only in degree, and that the more thoroughly the brain is examined the more cases of subacute encephalitis will prove to be of inclusion type.

1. Greenfield, J. G. *Brain*, 1950, **73**, 141.
2. Dawson, J. R. *Amer. J. Path.* 1933, **9**, 7.
3. Brain, W. R., Greenfield, J. G., Russell, D. S. *Brain*, 1948, **71**, 365.
4. Campbell, A. M. G., Guy, J., Walter, W. G. *Arch. Dis. Childh.*, 1952, **27**, 507.
5. van Bogaert, L. *J. Neurol. Psychiat.* 1945, **10**, 61.

Sir HOLBURT WARING, consulting surgeon to St. Bartholomew's Hospital, and formerly president of the Royal College of Surgeons and vice-chancellor of the University of London, died on Feb. 10, at the age of 86.

Public Health

MORTALITY IN THE LONDON FOG INCIDENT, 1952

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THE Meuse Valley fog episode in 1930 caused 64 deaths, and the Donora (Pennsylvania) episode in 1948 caused 20 deaths. In December, 1952, a four-day fog in London caused about 4000 deaths. This paper gives a short account of when and where these deaths occurred, the age-distribution, and the reported medical causes. No attempt is made here to present detailed meteorological data or to discuss clinical aspects; these and other features of the incident, including additional details about mortality, will no doubt be discussed in a report which, it is understood, will be made to the Minister of Health when investigations have been completed. Two papers have already been published concerning the effects of the fog on hospital admissions [1] and on general practice.[2]

TABLE I—DEATHS REGISTERED IN GREATER LONDON FROM WEEK ENDED NOV. 15, 1952, TO JAN. 10, 1953, COMPARED WITH THE ANNUAL AVERAGE FOR CORRESPONDING WEEKS OF THE FIVE PREVIOUS YEARS, 1947–52

Year	Deaths in week ended								
	Nov. 15	Nov. 22	Nov. 29	Dec. 6	Dec. 13	Dec. 20	Dec. 27	Jan. 3	Jan. 10
1952	1565	1699	1902	2062	4703	3138	2234	2977	2634
1947–52 (av.)	1747	1708	1809	1805	1852	1914	1923	2303	2213

The figures given here are from the Registrar-General's weekly returns, with additional data, and indicate that the incident was a catastrophe of the first magnitude in which, for a few days, death-rates attained a level that has been exceeded only rarely during the past hundred years—for example, at the height of the cholera epidemic of 1854 and of the influenza epidemic of 1918–19.

INCREASE IN DEATHS

Unusually dense fog developed over practically the whole of the Greater London area early in the morning of Friday, Dec. 5, 1952, and continued until early in the morning of Tuesday, Dec. 9. In relation to the periods for which the numbers of deaths registered are published in the weekly returns, the fog began towards the close of the week ended Saturday, Dec. 6, and continued into the first half of the week ended Saturday, Dec. 13; and it was in the latter week that the majority of the deaths due to the fog were registered. Table I shows numbers of deaths registered in the Greater London area (population about $8\frac{1}{2}$ million) from the week ended Nov. 15, 1952, to the week ended Jan. 10, 1953, compared with the annual averages in corresponding weeks of the five previous years. Deaths registered increased from 2062 in the week ended Dec. 6 to 4703 in the week ended Dec. 13 and 3138 in the week ended Dec. 20. In the next week (week ended Dec. 27) the number of registrations fell to 2234—less than 200 more than in the week before the fog incident. It is possible, therefore, that by that time the effect of the fog had more or less come to an end and was not responsible for the subsequent rise in mortality during the weeks ended Jan. 3 and 10. On the other hand, part of the decline in registrations in the week ended Dec. 27 may have been due to the intervention of the Christmas holidays, during which some registrations may have been postponed. It is not possible to be sure, therefore, that all the deaths brought about by the fog had been registered within the two weeks ended Dec. 13 and 20. Assuming that they were, the number of deaths so caused can be estimated to lie between 3717 (the excess in the weeks ended Dec. 13 and 20 over the week ended Dec. 6, 1952) and 4075 (the excess in the weeks ended Dec. 13 and 20, 1952, over the corresponding average for 1947–51). Having regard to the opposing considerations that all of the excess deaths in weeks ended Dec. 13 and 20 were not necessarily due to fog, and on the other hand that all of the fog deaths had not necessarily been registered within these two weeks, it is reasonable to estimate that in Greater London approximately 4000 deaths were brought about by the fog incident.

Table II gives numbers of deaths in the weeks ended Dec. 6, 13, and 20 in Greater London, divided into London administrative county and the outer ring, with the latter also subdivided by county areas, and in the 160 great towns of England and Wales minus Greater London. Although a certain amount of dense fog was reported in other areas it is evident that it was only

1. Abercrombie, G. F. *Lancet*, Jan. 31, 1953, p. 234.
2. Fry, J. *Ibid*, p. 235.

TABLE II—DEATHS REGISTERED IN LONDON ADMINISTRATIVE COUNTY AND THE OUTER RING (BY COUNTY AREAS) AND IN THE 160 GREAT TOWNS OF ENGLAND AND WALES: WEEKS ENDED NOV. 29, 1952, TO JAN. 10, 1953

Area	Deaths in week ended							Ratio of week ended Dec. 13 to Dec. 6
	Nov. 29	Dec. 6	Dec. 13	Dec. 20	Dec. 27	Jan. 3	Jan. 10	
London A.C. ..	853	945	2484	1523	1029	1372	1216	2·6
Outer ring:	1049	1117	2219	1615	1205	1605	1418	2·0
Middlesex ..		*499*	*942*	*728*				*1·9*
Surrey ..		*293*	*564*	*390*				*1·9*
Kent		*103*	*174*	*104*				*1·7*
Herts		*21*	*45*	*33*				*2·1*
Essex		*201*	*494*	*360*				*2·5*
160 great towns	6042	6647	9452	7701	6472	7842	7617	1·4
Great towns minus Greater London ..	4140	4585	4749	4563	4238	4865	4983	1·04

TABLE III—DEATHS REGISTERED IN LONDON ADMINISTRATIVE COUNTY, BY AGE: WEEKS ENDED DEC. 6 AND 13, 1952

—	Age							
	All ages	Under 4 weeks	4 weeks–1 year	1–14	15–44	45–64	65–74	75 and over
Dec. 6	945	16	12	10	61	237	254	355
Dec. 13 ..	2484	28	26	13	99	652	717	949
Ratio of week ended Dec. 13 to week ended Dec. 6 ..	2·6	1·8	2·2	1·3	1·6	2·8	2·8	2·7

TABLE IV—PERCENTAGE AGE-DISTRIBUTION OF DEATHS REGISTERED IN LONDON ADMINISTRATIVE COUNTY, WEEKS ENDED NOV. 29, 1952, TO JAN. 3, 1953

Age (years)	Week ended					
	Nov. 29	Dec. 6	Dec. 13	Dec. 20	Dec. 27	Jan. 3
Under 1 ..	3	3	2	2	2	3
1–44	5	8	5	5	6	5
45–64	25	25	26	23	24	25
65 and over ..	67	64	67	70	68	67
All ages ..	100	100	100	100	100	100
Total number ..	*853*	*945*	*2484*	*1523*	*1029*	*1372*

in Greater London that there was an appreciable increase in mortality in the week ended Dec. 13. In the remainder of the great towns (aggregate population 14 million) the increase amounted to only 164 deaths, compared with an increase of 2641 in Greater London. Incidentally the fact that the subsequent rise in numbers of registrations in the weeks ended Jan. 3 and 10, already noted for Greater London, was paralleled in the remainder of the great towns supports the suggestion that this later increase in mortality was independent of the fog.

Within the Greater London area the abrupt increase for the week ended Dec. 13 occurred both in the central area (administrative county) and in the outer ring; as the right-hand column of table II shows, the weekly mortality in the central area almost trebled (ratio 2·6) and in the outer ring it doubled (ratio 2·0). The breakdown of the outer ring into towns within the constituent county areas indicates that mortality increased most sharply in the Essex section (ratio 2·5) and least in Kent (ratio 1·7). But clearly no large section of the Greater London area escaped. As examples of what happened in some districts, deaths registered in Stepney increased from 29 to 119 (ratio 4·1), and in East Ham from 16 to 62 (ratio 3·9).

TABLE V—NUMBERS OF DEATHS ASSIGNED TO VARIOUS CAUSES, LONDON ADMINISTRATIVE COUNTY: WEEKS ENDED NOV. 29, 1952, TO JAN. 3, 1953

Cause of death	Week ended					
	Nov. 29	Dec. 6	Dec. 13	Dec. 20	Dec. 27	Jan. 3
Respiratory tuberculosis	19	14	77	37	21	24
Cancer of lung	27	45	69	32	36	48
Vascular lesions of C.N.S.	98	102	128	119	91	131
Coronary disease	131	118	281	152	109	150
Myocardial degeneration	79	88	244	131	108	136
Influenza	7	2	24	9	6	4
Pneumonia *	28	45	168	125	91	104
Bronchitis	73	76	704	396	184	215
Other respiratory diseases	8	9	52	21	13	10
Motor-vehicle accidents	1	8	4	10	4	5
Suicide	5	10	10	7	5	12
Total (all causes)	853	945	2484	1523	1029	1372

* Excluding deaths at ages under 4 weeks.

ANALYSIS OF DEATHS

Age-distribution

Table III compares the age-distribution of deaths registered in the London administrative county in the weeks ended Dec. 6 and 13. Although the increase in mortality was greater at older than at younger ages it was slightly less at ages 75 and over (ratio 2·7) than at ages 45–74 (ratio 2·8). The mortality of newborn infants almost doubled, and that of infants aged 1–12 months more than doubled. Deaths of children rose by a third (from 10 to 13) and of young adults by close on two-thirds (from 61 to 99). It is clear, therefore, that all ages shared to some extent in the increased mortality, and that it was by no means confined to the very young or the very old. Altogether there was relatively little disturbance of the usual age-distribution of deaths, as is shown in table IV which gives the percentage of deaths at various ages during several successive weeks.

TABLE VI—DEATHS FROM BRONCHITIS AND FROM PNEUMONIA BY AGE, LONDON ADMINISTRATIVE COUNTY: WEEKS ENDED DEC. 6, 13, AND 20, 1952

Age (years)	Bronchitis			Pneumonia (at ages over 4 weeks)		
	Dec. 6	Dec. 13	Dec. 20	Dec. 6	Dec. 13	Dec. 20
Under 1	2	6	1	5	9	7
1–44	—	11	4	2	4	6
45–64	21	193	95	11	31	16
65 and over	53	494	296	27	124	96
All ages	76	704	396	45	168	125

Causes of Deaths

Deaths registered in the London administrative county increased by about 1500 in the week ended Dec. 13, and the about half of the increase was attributed to bronchitis or pneumonia. Deaths from bronchitis increased by over eight times (from 76 to 704) and deaths from pneumonia by almost three times (from 45 to 168) (table V). In the next week—the week ended Dec. 20—deaths from bronchitis totalled 396, still a very high figure, and deaths from pneumonia numbered 125. Other causes of death that increased greatly in the week ended Dec. 13 were respiratory tuberculosis (from 14 to 77), cancer of lung (from 45 to 69), coronary disease (from 118 to 281), myocardial degeneration (from 88 to 244), and "other respiratory diseases" (from 9 to 52). 24 deaths were certified as due to influenza compared with 2 in the previous week. There was no increase in deaths from motor-vehicle accidents—possibly because fewer vehicles were on the roads—and there was no increase in deaths by suicide.

The age-distribution of deaths from bronchitis and from pneumonia are shown in table VI. As for deaths from all causes combined, the increases were greatest at advanced ages, but young persons by no means escaped. Deaths from bronchitis at ages under 45 rose from 2 in the week ended Dec. 6 to 17 in the next week, and deaths from pneumonia almost doubled (from 7 to 13).

TABLE VII—NUMBERS OF DEATHS CERTIFIED BY CORONER OR CERTIFIED AFTER POST-MORTEM EXAMINATION, GREATER LONDON: WEEKS ENDED DEC. 6, 13, AND 20, 1952

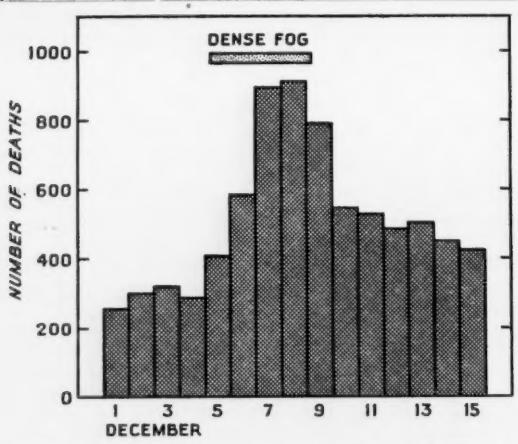
Week ended	Total deaths	No. certified by coroner	No. certified after post-mortem examination		
			Coroners'	Others	Total
Dec. 6	2062	458 (22%)	452	169	621 (30%)
Dec. 13	4703	962 (20%)	960	267	1227 (26%)
Dec. 20	3138	680 (22%)	680	203	883 (28%)

Deaths Certified by Coroners

One of the results of the sudden increase in mortality was to double the work of coroners and coroners' pathologists. Their reports will provide valuable information about the pathological changes found and may throw

TABLE VIII—DEATHS IN GREATER LONDON AND CONSTITUENT AREAS BY DATE OF OCCURRENCE, DEC. 1–15, 1952 (EXCLUDING ANY DEATHS OCCURRING WITHIN THESE DATES BUT NOT REGISTERED BY DEC. 20). ATMOSPHERIC POLLUTION READINGS AT KEW OBSERVATORY, RICHMOND (SOUTH-WEST LONDON)

Area	Deaths on Dec.														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Greater London	259	301	321	288	406	581	894	910	792	543	528	484	501	449	425
London A.C.	112	140	143	120	196	294	513	518	430	274	255	236	256	222	213
Outer ring	147	161	178	168	210	287	381	392	362	269	273	248	245	227	212
Atmospheric pollution (mg. per c.m.), max. reading	*0·30*	*0·95*	*0·30*	*0·95*	*2·55*	*2·55*	*1·70*	*1·95*	*1·45*	*0·30*	*0·30*	*0·45*	*0·45*	*0·95*	*0·56*



Deaths in Greater London each day from Dec. 1 to 15, 1952.

some light on the mechanism whereby the deaths occurred. As table VII shows, there was a very large increase in the week ended Dec. 13 in the number of cases certified by coroners and in the number of post-mortem examinations. In relation to the increased numbers of deaths, however, the proportions of coroners' cases and post-mortem examinations were slightly reduced. Cases certified by coroners include only those where referral to a coroner resulted in an inquest or post-mortem examination; the total number of referrals is not known.

Number of Deaths Each Day

One of the most striking features of the incident was the rapidity at which deaths started to increase. Table VIII shows the number of deaths *occurring* each day (not numbers of registrations as in other tables). Even on Dec. 5, the first day of the fog, there was an obvious increase in the number of deaths, and the daily totals mounted rapidly to their highest levels on Dec. 7 and 8, the third and fourth days of the fog. There was some decline on Dec. 9, and a still greater decline on Dec. 10; but even on Dec. 15 the daily total was almost twice as high as before the fog began (see figure).

PREVIOUS INCIDENTS

The 1952 incident is not the first in which dense fog in London has caused a sudden increase in deaths; as recently as 1948 a continuous but less dense five-day fog was responsible for some 300 deaths in the London administrative county.[3] But so far as can be ascertained from a rapid search through the weekly returns, such events have been very rare, and only three others have been traced in which an association between dense fog and suddenly increased mortality has been clear-cut. In table IX mortality is related to these three incidents and to those in 1948 and 1952. It is evident that the increase in mortality in the 1952 incident was very much greater than on previous occasions.

There is reason to believe that the fog incident in December, 1952, caused deaths in London on a scale possibly never experienced before from this cause. It is to be hoped that such an event will never recur—or be allowed to recur.

TABLE IX—INSTANCES OF SUDDEN INCREASES IN MORTALITY IN THE LONDON COUNTY AREA ASSOCIATED WITH DENSE FOG

Year	Dates of dense fog	Deaths				
		Weekly totals				Ratio of deaths in week of suddenly increased mortality to deaths in previous week
1873	Dec. 9–11	*Dec. 13:* 1759	*Dec. 20:* 2415	*Dec. 27:* 1540	*Jan. 3:* 1842	1·4
1880	Jan. 26–29	*Jan. 31:* 2200	*Feb. 7:* 3376	*Feb. 14:* 2495	*Feb. 21:* 2016	1·5
1892	Dec. 28–30	*Dec. 31:* 1830	*Jan. 7:* 2509	*Jan. 14:* 2503	*Jan. 21:* 2101	1·4
1948	Nov. 26–Dec. 1	*Nov. 27:* 779	*Dec. 4:* 1019	*Dec. 11:* 944	*Dec. 18:* 891	1·3
1952	Dec. 5–9	*Dec. 6:* 945	*Dec. 13:* 2484	*Dec. 20:* 1523	*Dec. 27:* 1029	2·6

SUMMARY

The dense four-day fog in Greater London in December, 1952, was responsible for some 4000 deaths during the two following weeks.

The increased mortality affected persons of all ages, but particularly those aged 45 and over.

Deaths assigned to bronchitis and pneumonia increased eight times and three times respectively in one week.

A considerable increase in numbers of deaths occurred even on the first day of the fog.

Four previous London fogs resulting in a sudden increase in deaths have been noted; but the 1952 incident caused by far the largest increase.

THE FLOODS AND THE HEALTH SERVICES

ON Saturday night, Jan. 31, a severe gale combined with an unusually high tide to produce one of the worst floods ever recorded in the flat lands bordering the North Sea. England, Holland, and Belgium have all suffered severe loss of life and damage to great tracts of land and property. Holland has suffered most; the low islands of Zeeland and the mouth of the Scheldt have been almost entirely devastated, with a tragic death-roll which at the time of writing is still lengthening. The east coast of England was struck from Yorkshire to Kent with a force unparalleled probably since the beginning of the 18th century. Over 250 people lost their lives, more required treatment for injury or exposure, and tens of thousands were rendered homeless; sewage works were flooded and put out of action, water-supplies were contaminated. The whole disaster put an immense strain on the health and welfare departments of the local authorities concerned, and it is heartening to be able to record that everywhere those responsible rose to the occasion. Regional and national schemes for coördinated help came to the rescue wherever necessary, mostly with emergency supplies and a watchful eye over all; but on the whole those on the spot have dealt smoothly and efficiently with the many problems of health, welfare, and sanitation, as well as with the care of the injured and homeless, and they deserve all praise for their enterprise, initiative, and self-reliance. The offers of help from other areas have been numerous and prompt.

The most serious public-health problems have been concerned with sewage. At Tilbury the main sewage works were put out of action and at Grays the main sewer burst. The result was that the flood waters became contaminated. Fortunately the water-supply to the area affected was all from mains under pressure and there has been no danger from this source. At Canvey Island, however, the worst-stricken area, the water-supply has been superchlorinated as a precaution and those using surface wells have been advised to boil their water. In the Isle of Sheppey there has been contamination of,

3. Logan, W. P. D. *Ibid*, 1949, i, 78.

and interference with, water-supplies: a limited mains supply of chlorinated water has been provided for domestic and washing use and a ration of about a gallon of pure water a day a head brought into the island for drinking and cooking purposes. Elsewhere there has been little or no interference with main water-supplies, though many have been chlorinated as a precaution, but surface wells have been affected by flooded sewers and people have been advised locally to boil all water. As most of the flood water is brackish, contaminated supplies are usually unpalatable.

At Kings Lynn the Isolation Hospital was flooded, and evacuated just in time. The other hospitals in the town were affected, but were able to keep going. Except for the railway Tilbury Hospital has been completely isolated by the floods; but it has not been evacuated and has continued to serve the population round the docks. Long Reach Hospital, Dartford, was flooded; it is the main smallpox hospital for the London area and was empty: alternative arrangements have been made to deal with any cases that might arise. Two convalescent homes and one small hospital in other regions were put out of action. Otherwise the hospitals escaped lightly and could deal with the patients brought to them suffering from injury, shock, or exposure, as well as a number of old people normally cared for at home but too frail for rest centres. Arrangements were made for transfer of casualties to other hospitals inland if necessary, but happily little use had to be made of this precaution.

Local general practitioners worked hard and well to maintain services, and many offers of help were received from other areas. Instructions have been given to those concerned that spectacles and dentures lost or damaged in the disaster are to be replaced as speedily as possible, free of charge.

The great problem, however, has been a welfare one—the care of the homeless. Rest centres were opened in all the affected areas and many thousands passed through them. Voluntary workers and officials have combined to smooth out the immense difficulties of handling such great numbers of cold, wet, frightened people, of warming, feeding, and identifying them, and of passing them on to friends, relations, or voluntary billets. Known cases of open tuberculosis have been taken out of the rest centres and admitted to sanatoria. The central reserve stores have contributed blankets, mattresses, camp-beds, heating stoves, crockery, towels, nappies, and all the many things needed over and above the great stream of clothing which is flowing so swiftly and steadily from all parts of the country.

At the time of writing, a week after the disaster, the problems are changing. Most of the homeless have found billets, but in certain areas there is still a substantial number awaiting accommodation. The flood waters are receding and the problem of cleansing houses of mud, often sewage-contaminated, has to be faced. There is no reason at present to fear an outbreak of enteric, but the possibility of odd cases, even of small outbreaks, of this or other sewage-borne infections cannot be entirely excluded in areas where contamination with sewage has occurred. Meanwhile influenza is complicating some of the work but not so far seriously. The critical emergency is over for the moment (though another high tide is due at the end of this week) and those concerned are looking forward to the long and difficult task of restoring normality.

Statistics for 1921–30

Part III[1] of the Registrar-General's Decennial Supplement series for 1931 has now been issued. This volume groups the data for England and Wales on population, births, marriages, and deaths previously published in the annual statistical reviews for the ten years 1921–30.

1. Registrar-General's Decennial Supplement, 1931, Part III. H.M. Stationery Office. Pp. 574. £3 10s.

Influenza

The indications, reported last week, of an increased incidence of influenza in London and Southern England have been followed by a distinct increase in the number of deaths from this cause. In the 160 great towns such deaths totalled 313 in the week ended Jan. 31, compared with 29, 51, 72, and 132 in the four preceding weeks from Jan. 3 to 24. In London and the south eastern region there were 219 deaths, while in Greater London alone there were 170 deaths. Elsewhere, only in East Anglia has there been any considerable relative increase in deaths—to 25 in the week ended Jan. 31, compared with 3 in the previous week. Other regions of England and Wales remain free from any widespread outbreak of the disease.

In the week ended Jan. 31 the 313 deaths in the great towns were distributed by age as follows: under 1 year, 1; 1–5, 3; 5–15, 1; 15–25, 3; 25–35, 4; 35–45, 9; 45–55, 9; 55–65, 46; 65–75, 104; 75 and over, 133.

Laboratory reports confirm that the majority of the cases are due to the "Scandinavian" strain of A-prime virus, though virus B has been reported to be present in certain areas.

Emergency Bed Service.—A red warning was replaced on Feb. 3 by a yellow warning, which was withdrawn on Feb. 4 but reimposed on Feb. 10.

Weekly Claims to Sickness Benefit.—The weekly claims on the Ministry of National Insurance (including Scotland) for sickness benefit since the start of this year, with comparable figures for 1952, have been as follows:

Week ended	*Claims*	
	1953	*1952, corresponding week*
Jan. 6	199,063	188,164
Jan. 13	208,168	166,409
Jan. 20	201,721	155,292
Jan. 27	239,091	162,522
Feb. 3	276,883	175,552

Fluoridation of Water-supplies

Six years ago the civic authorities of Marshall, Texas, agreed to the addition of fluoride to the town's water-supply. It is now reported[1] that six-year-old children in Marshall have less than half the number of dental cavities found in children of the same age living in neighbouring towns. It is said that more than 35% of Marshall children have no dental caries, compared with 13% in nearby Jacksonville.

The Third Quarter in Eire

In Eire during the September quarter of 1952,[2] the birth-rate was 21·5 per 1000 population, and the death-rate 9·9. The death-rate for tuberculosis was 0·4 per 1000 population (respiratory 0·3 and other forms 0·1), compared with 0·6 (0·4 and 0·2) in the corresponding quarter of 1951. The maternal-mortality rate was 1·6 per 1000 births registered (0·9 in the corresponding quarter of 1951). The infant-mortality rate was 36, and the neonatal death-rate 20, per 1000 births registered.

1. *Times*, Jan. 29, 1953.
2. Quarterly return of the Marriages, Births, and Deaths registered during the September quarter, 1952. Obtainable from the Government Publications Sale Office, G.P.O. Arcade, Dublin. Pp. 47. 6*d*.

Infectious Diseases in England and Wales

Disease	Week ended Jan.				
	3	10	17	24	31*
Diphtheria	25	22	12	19	24
Dysentery	262	214	312	419	435
Encephalitis:					
Infective	5	1	3	4	2
Postinfectious	1	3	5	3	6
Food-poisoning	47	72	46	62	60
Measles, excluding rubella	30,499	24,738	21,385	21,882	26,460
Meningococcal infection	55	43	45	38	45
Ophthalmia neonatorum	32	33	40	28	32
Paratyphoid fever	..	2	8	8	7
Pneumonia, primary or influenzal	1423	1169	1205	1349	2029
Poliomyelitis:					
Paralytic	27	23	25	15	22
Non-paralytic	10	11	6	9	7
Puerperal pyrexia	220	258	212	265	282
Scarlet fever	1716	1238	1589	1832	1850
Smallpox	..	..	..	..	..
Typhoid fever	1	..	1	3	1
Whooping-cough	2165	2060	2170	2792	2799

* Not including late returns.

Special Articles

RESEARCH AND MENTAL HEALTH

LAST WEEK'S CONFERENCE IN LONDON

NOWADAYS in our society the child often finds himself rare, precious, and in the way. Dr. MILDRED CREAK (physician to the department for psychological medicine, at the Hospital for Sick Children, Great Ormond Street) drew attention to this juvenile predicament at the annual conference of the National Association for Mental Health, held on Feb. 5 and 6, with Prof. C. FRASER BROCKINGTON presiding.

Recent Advances in Theories of Child Care

The small family, the small house, and the multiplication of ageing adults, Dr. CREAK said, bring new problems in interpersonal relationships. In some ways the child is getting a better start than he did earlier in the century. She mentioned the change which is coming over the conduct of confinement in hospitals. At one period, especially in the United States, there was a strong move to separate the mother and the child, and to substitute artificial feeds, prepared to a precise formula, for breast-feeding. The accoucheur and the nurse were the prima-donnas of the performance, and when the mother was allowed to take her baby home she hardly knew how to bath him. Opinion has now swung over, and in one American clinic the baby sleeps by his mother, and is fed when he demands it. Similar research is also going on in London—with one group of babies fed according to the clock, and another group fed on demand—to determine which babies do better, and which method throws more strain on the mother. Dr. Creak recalled the observations of Bowlby on the stunting of emotional growth of infants produced by deprivation of the mother, and the persistence later in such children of infantile characteristics: they are apt to lack initiative, and to concentrate poorly, their interest being of a superficial flitting kind. She discussed the new move to allow more visiting by parents when children are in hospital, and mentioned the film[1] made by Dr. René Spitz which shows the damaging effects of long-term deprivation on infants in residential care. Of nursery schools and day-nurseries (now likely to be cut down) she said that, while experts are sure his own home is the best place for the young child, mothers are equally sure they need day-nurseries and nursery schools—largely, she believes, because homes are nowadays so small. The maternity and child-welfare centres, which greatly help the mother of the pre-school child, are nowadays reinforcing their staffs, in some places, with a psychiatrist and a psychiatric social worker; and child-study centres in London and Leeds are studying the normal child. The difficulty is that the various bodies giving the mother advice are apt to have various outlooks. The maternity and child-welfare clinic, the nursery school, the primary school, and the child-guidance clinic are all differently oriented towards the child; and even the Government departments responsible for children—the Ministry of Health, the Ministry of Education, and the Home Office—do not necessarily speak with one united voice. She spoke with feeling of the "creeping crushing emergency" of growing lists of psychiatric patients at our hospitals and clinics, and mentioned the debt psychiatry owes to psycho-analytic theory, which has drawn attention to the significance of early parent-child relationships. Many new lines of research are converging on mental health. If they are to be brought coöperatively to bear on it, the keynote must be successful communication among researchers.

1. See *Lancet*, 1948, ii, 106.

Miss A. M. SCORRER (chief inspector in the children's department of the Home Office), speaking of children under residential care, mentioned the problems created by rising numbers, old buildings, and the need to find ways of preventing children from coming into care, and of restoring them as soon as possible to their families. Hearing the many opinions nowadays voiced on child care, she remarked, made her grateful for the resilience of children. She noted that whereas in 1948 at the time of the Children's Act, we were all talking of "deprived" children, we are now more inclined to talk of children "in care," which suggests at least that we are paying more attention to the need for care, and the circumstances which put children in the position of needing it. At a recent date there were 63,000 children in the care of local authorities in the country, and during the year preceding this date 36,000 came into care and 33,000 went out of care. Over half of them were under five, and 46% of the girls and 39% of the boys were boarded out—nearly a quarter of them in family-group homes. She reminded the conference that not every deprived child will develop a pathological state later, or needs to be brought up in the expectation that it will. It is not possible to provide a complete substitute for a normal home life, or to prevent serious emotional effects in some cases; but it is possible to provide, for many children, effectual substitutes for home life. Thus in residential nurseries there is now a system of arranging that nursery mothers shall be personally responsible for three or four children. Adoption is arranged when possible: and there are more adopters than children to be adopted. Boarding-out with ordinary families is also widely used; and "home groups" are formed, made up of children of various ages and both sexes, who live in an ordinary house with a "home" mother and father, and go out to the ordinary school and join in ordinary neighbourhood pursuits. This often works well, but when the child grows up and leaves he is unlike other young people in that he no longer has the family home behind him to return to at a time of stress. He is therefore encouraged to make friends in the neighbourhood while he is still in care; and often these friends take the place of uncles and aunts, or other relatives.

Miss E. N. BARTLETT (psychologist to the Essex Education Committee), discussing the application of recent theories to the education of children at school, mentioned the lag between the acceptance of a theory by experts and its application in practice by ordinary teachers. Most teachers (like most psychologists), she said, are ordinary, and their practice is limited by external conditions in the form of administrators, architects, and epidemics. When half the children are away with measles she has often noticed the improvement—the release and optimism—in the affected class. A teacher dealing with 55 eight-year-olds in a classroom meant for 40 is rightly sceptical of the intelligence of those who advocate such things as more personal attention, coaching for the backward in small groups, and special and sensitive handling of the maladjusted child. The most effective thing for the psychologist to do in these circumstances is to try to establish among teachers a climate in which new ideas and attitudes will flourish; and in fact the climate is slowly changing to one favourable to such ideas. Many things hamper the change. Thus the young teacher, fresh from college, and full of ideas of treating children as persons, may be so poor a hand at managing a class that she does not give the children confidence: she may excite hostility, and respond with hostility, and even become permanently hostile; and she will find plenty of tired colleagues to point the moral. Again, she may understand the new ideas imperfectly—for emotional as well as intellectual reasons. The good young teacher, with good luck, may develop into the good experienced teacher; with bad

luck, she may not. But at all events the state of the child's emotions has been recognised as an essential factor in education: the intelligence cannot function rightly unless all is well with the feelings. Every gain in knowledge and skill is steadying and releasing, enabling the child to go on towards maturity. In addition to his bread-and-butter tasks the child needs as she put it, experience of pungency and excellence. Nothing but commonplace experiences makes a commonplace person. The right kind of books should fall in his way at the right time. She mentioned *The Kon-Tiki Expedition* and *The Worst Journey in the World* as offering pungency; and any subject can give the child experience of excellence. The woodwork master and the games master share a particular claim to success here because they can demonstrate skill. The child under eight needs the opportunity to enter into group projects; but he expects a school to be a school and not a child-guidance clinic, and within those limits should be able, she said, to get the emotional nurturing he needs from the teacher. Round about eight he reaches a crisis in which the need to excel in some direction or another is very strong, and the success of others can produce a sense of inferiority. The character of the emotional nurture provided by the teacher should change from mothering to friendliness and interest, and the group projects should have more objective and real ends. Aggression needs some outlets other than surreptitious sulks, or semi-hysterical laughter at the unexpected gift of a joke from the rostrum. Even an explosion from the teacher, used skilfully, has its advantages. Adolescents need individual contact and respond well to the tutorial system; a transference situation is almost necessary for successful teaching at this age, and it is the experience of universities that an undergraduate may discover it was the schoolmaster, not the subject, that he liked. The sullen wooden school-child who is unable to learn often speaks of the teacher as "she," and the rest of the class as "they," because he feels out of it. Affection and interest may decide whether he is able to keep going or not. How much of all this can be got across to the ordinary teacher? Directly, Miss Bartlett thought, relatively little; indirectly much. A course of lectures on the backward child will attract every teacher within reach, whereas one with the same content but entitled "Mental Health" will hardly bring in one.

In the ensuing discussion a school-teacher urged that the principles of mental hygiene should be taught to girls in secondary schools, since they would be having to put them into practice on their own children in a few years' time. Another speaker defended the day-nurseries, which she said often prevented children coming into care by giving the harassed mother just the relief she needed, and by providing for the child what was in essence an extension of the home.

Recent Research into Mental Illness

At another session, Dr. DENIS HILL (physician for psychological medicine, King's College Hospital) said the factors which may prevent an individual from adapting himself to his environment are constitutional and environmental, and the interplay between them. The danger-signal is anxiety. In the infant emotional development is hindered when normal gratification is reduced (for instance, by separation from the mother); or rationed (by a too strict feeding régime, or other evidence of hostility); or impossible (perhaps because the father is too powerful a rival). Psycho-analytic theory has not shown why one person responds to stress by neurosis and another does not; but differences of genetic endowment must play some part. Studies of twins have shown that there is a single-factor type of inheritance for schizophrenia. If one of a pair of identical twins has schizophrenia there is an 86% chance that the other will develop it. With ordinary brothers and sisters and non-identical twins the chance is only 14%, and in half-brothers only 7%. Conditions reducing the stability of the body-weight reduce the resistance to schizophrenia in those predisposed to it. There is also evidence that a tendency to neurosis is inherited, but here multiple genes are involved. Stresses and resistances vary: thus one form of stress may break down a weak resistance in a person vulnerable to almost any stress; but may also find the Achilles heel in a person who would resist other kinds of stress. Some physical evidence of liability to schizophrenia may be offered by the type of skin capillary loops visible in the nailbeds. Possibly in this disease these are immature in type, and it may become possible to think in terms of capillary age much as we think in terms of bone age. Modern techniques, such as the use of the electro-encephalograph, the electron microscope, the behaviour of radioactive substances in the brain, the response to anoxia, glucose starvation, and various drugs, are beginning to provide us with new evidence. It has been shown that schizophrenic patients are unable to maintain a constant level in almost all physiological functions. The adrenal cortex pours over 90 secretions into the blood; and in America the adrenal cortex has been removed in some cases, and substitution therapy given. The results cannot yet be assessed. Many epileptics have a hyperexcitable area in the temporal lobes; in some cases this can be removed surgically, with benefit to the patient. Electrical stimulation of small areas of the temporal cortex, during the operation, has caused these patients to recall vividly some event or events in their past lives—so vividly that as far as they are concerned they relive the scenes. Yet when these areas are removed they can still recall these events, and can remember that the surgeon was able to stimulate recall in this way.

Dr. R. STRÖM-OLSEN (physician-superintendent of Runwell Hospital), speaking of the influence of recent advances in the prevention and treatment of mental illness, remarked that there is as yet no agreement on standards of mental normality. He reviewed briefly the many methods of prevention and treatment now in use. Child guidance, he said, is reducing the incidence of adult neurosis, Darby and Joan clubs are reducing the danger of mental breakdown in old age, and youth clubs, vocational guidance, and marriage guidance are all useful forms of preventive work. We have a growing knowledge of the effect of drugs for narcosis, for abreaction, and in neurophysiological research. The multidimensional approach in neurosis is giving results, and day hospitals, and psychiatric social clubs are valuable in the treatment of patients getting back to work, or suffering from the loneliness so common among the mentally sick. These are the more valuable in that long inpatient treatment of neurotics has never been very successful. Psychodrama, drawing, painting, and sculpture are also proving effective means of expression. In America they have tried putting two psychiatrists, one more senior, on to the same case; they treat him jointly, and it is said that the transference is more easily dissolved in these circumstances. Outpatient methods are developing. Disulfiram ('Antabus') has provided a new and successful means of dealing with those alcoholics who will tolerate the treatment. Œstrogen therapy has been of great service in reducing hypersexuality in males, and in particular has given relief to homosexuals. The value of male sex hormone in the treatment of frigidity in women has not yet been substantiated. In the field of neurosurgery the standard prefrontal leucotomy operation has given place to open operation and the more exact techniques of topectomy and cortical undercutting, but no final opinion on results can be given as yet.

CORPORAL PUNISHMENT

HOWARD LEAGUE MEETING

A PUBLIC meeting was held at the Caxton Hall on Feb. 3, under the auspices of the Howard League for Penal Reform, to protest against the reintroduction of corporal punishment which is proposed, as an amendment to the Criminal Justice Act of 1948, by a Private Member's Bill due for its second reading on Feb. 13.

Mr. KENNETH YOUNGER, M.P., who was in the chair, said that he regretted the proposal to reverse so soon a measure of penal reform which had been the subject of most controversy during the passage of the Act of 1948. Indeed, this clause had been responsible for the only division of the House on the Act, and it had been referred back to the Commons by the Lords—chiefly at the instigation of judicial and ecclesiastical peers.

Mr. GERALD GARDINER, Q.C., who spoke on Corporal Punishment as a Deterrent, reminded the meeting that one of the two main objects of the Howard League was to reduce crime. He could only speak as a lawyer, and say how he thought this could best be achieved. At first sight the case for corporal punishment might appear incontrovertible: there was an increase in crimes of violence and we all felt sorry for the victims and wanted to stop the crime wave; if corporal punishment would do this, let us have it back. It had been found in the past, however, that legislation passed in haste in response to popular agitation, such as that stirred up by the current press campaign, was often proved later to be wrong. There was some exaggeration by opponents of corporal punishment about the effects of the "cat"; when administered under strict medical supervision only about 2% of the men flogged had to be admitted to hospital. On the other hand, the protagonists of corporal punishment tended to minimise the effects of birching.

The only thing to do, Mr. Gardiner said, was to examine the facts, and he had yet to meet a supporter of corporal punishment who had taken the trouble to study the relevant documents—carefully collected by the Cadogan Committee in 1938. This committee had come to the conclusion that flogging and birching differed very little in the pain they inflicted; and they had examined the history of punishment, studying its effects during the preceding thirty years. They had also considered the history of all offenders convicted of robbery with violence (practically speaking, the only offence for which flogging could be awarded), and they had found that the subsequent history of men who had been flogged was worse than that of men who had not been flogged. This could not be explained on the grounds that only hardened offenders had been flogged, for the same applied to men flogged for a first offence. More of the men awarded corporal punishment committed further offences, and more than twice as many committed robbery with violence again. The committee had also examined the claims that corporal punishment had put a stop to garrotting in London in the 1860s and to the other outbreaks of crime. In none of these instances, often quoted by supporters of flogging, was this claim substantiated. Experience in Scotland, where flogging was stopped in the 1860s, also refuted the argument that corporal punishment had a deterrent value, for the decline in crime in that country had been greater than in England, where flogging was retained until 1948. No civilised country in the world outside the British Commonwealth retained flogging as a penal measure, except the States of Delaware and Maryland in the U.S.A.

The efficacy of corporal punishment as a strong deterrent had always been strenuously maintained by judges, but Mr. Gardiner felt that judges were in no way qualified to form a valid opinion. The people who were deterred from committing crimes never came into court. What deterred the average citizen was his own conscience and sense of moral values; at the other extreme, there were people so antisocial that nothing would deter them. The wobbler in between might or might not commit crime, depending on his awareness of a deterrent or its lack. For such people, he was convinced, the probability of detection constituted a far more cogent deterrent than the nature of the punishment. It was much to be regretted that our police force was now 10,000 under strength, and that the rate of conviction, which before the late war was 75%, was now just under 50%.

One class of criminal, the aggressive psychopath, tended to commit the most brutal crimes because of his callousness and lack of conscience; and the "short sharp punishment" of flogging combined with, say, six months in gaol would mean that such a man was returned to the community in the same state within a very short space of time. For such cases we needed something between a prison and a Broadmoor; but the longer sentence of preventive detention provided for under the 1948 Act was not being given a chance to prove itself, because of shortages in prison staff and buildings.

The Rev. DONALD SOPER, PH.D., speaking on the Ethics of Corporal Punishment, said that in this country, professedly Christian, the ethics of any punishment should be Christian ones. He was not one who disregarded the doctrine of sin and human responsibility; he did not subscribe to modern ideas which attributed all crime to disordered glands, difficult circumstances, or bad government. So long as there were sinners, there would be crime, and crime had to be punished. The aim of punishment from a Christian viewpoint must be reformative. It was often said in favour of corporal punishment for crimes of violence that it was making the punishment fit the crime; he would say rather that it was making the punishment resemble the crime—and psychologists would say repeat the crime.

The Christian regarded the criminal as one of the children of God, and therefore of immeasurable worth as a human being. Lack of consideration for his individual value was on the road to the totalitarian outlook. In his experience of more than twenty years as a prison chaplain, Dr. Soper had not come across one criminal whom he had found unworthy of consideration as an individual. He thought there was no evidence that corporal punishment reformed a man; it might harden him or cow his spirit; it was the exemplification of the doctrine "an eye for an eye . . .," expressly repudiated by Our Lord. Moreover, it was a topic that invariably aroused strong emotions. Why did everyone get in a fever when they discussed it? Surely because it was so closely bound up with the sexual element, the sadism and the masochism latent in all of us. He had seen men flogged, and he remembered a man who undoubtedly got erotic satisfaction out of being flogged; and moreover he had heard flogged men talking of this afterwards. Similar ignoble emotions were stimulated in the officials who had to administer the flogging. It was a form of punishment which degraded both the recipient and the administrator.

The argument was sometimes used that some criminals could only be got at by physical pain. To do so, Dr. Soper thought, was merely to confirm the criminal in the methods of violence he had himself used. People like Craig and Bentley were products of a pagan world in which the individual felt lonely and unwanted and sought his satisfaction in power and excitement. To reclaim such individuals we needed a form of punishment which had love as its motive—not sloppy sentimentality but the realisation that these individuals were frustrated and lost and needed to be brought back into the family of the community, where they would find a place and feel wanted and valued for themselves. Corporal punishment belonged to our modern world which had given itself over to violence; and unless we were prepared for sacrifices, such as spending money on our prisons, and for a

revolutionary change in our moral outlook, violence would become our master.

The meeting passed unanimously a resolution calling on the Government to reject the proposed Bill.

Medicine and the Law

The Nurse and the Tea-tray

AFTER the perils of hot-water bottles in hospitals and nursing-homes [1] we have now the perils of the hot-water jug on the tea-tray. In Trew *v.* Middlesex Hospital [2] it appeared that a nurse placed a tea-tray on the lap of a private patient sitting up in bed. The tray tilted and hot water from the jug was spilt and burnt him. The plaintiff's allegations of negligence were that the hospital ought to have provided a bed-table, or that the nurse should have set the tray in a safe position or should have ensured that he had control of it. The patient had one leg in a sling and the other on a pillow; he had been sitting as upright as he comfortably could. There was perhaps not much room on the bed for a horizontal position for the tray. The evidence of the nurse was that the patient was somewhat impatient; she said she had asked him if the tray was all right and he had assured her it was. The defence also emphasised that the patient had immediately received an apology and had said "Accidents will happen." It was suggested, moreover, that the injury was not very serious.

Mr. Justice Gerrard said that the nurse was a small, brisk woman who, according to the plaintiff, was in a hurry. Generalising perhaps a little speculatively, he said he could well imagine, and he thought it was a fact, that the nurse "breezed into the room, put down the tray and went out, giving the patient no time to protest." He gave judgment for the plaintiff for £100 with costs.

Medical Practice a "Business"

If the judges have occasionally seemed to transcend the rules of common sense in their interpretation of words, no-one will quarrel with the decision of Mr. Justice Danckwerts [3] that, in the circumstances of the case before him, a medical practice could be a "business." A father bequeathed a substantial part of his residuary estate upon trust so that money might be available for his son at the age of 35 "for the purpose of starting . . . in business or for the advancement of any business with which he may be concerned." The son had not qualified as a doctor at the date of the execution of the will. He qualified at the age of 34. After he was 35 the trustees asked the court whether they could lawfully apply the money for buying him a house to be used partly as his residence and partly as his surgery.

The learned judge said the clause should not be narrowly construed. Its object was to assist the son to maintain himself in a gainful occupation. Both the dictionaries and the reported decisions suggested that the word "business" was capable of including a profession. His lordship took note of the fact that the old method of buying a practice had now been altered; but he found evidence that it was often a condition of success that a doctor could take over a residence. Plainly his chances must be affected by his ability to acquire premises for his surgery and for consultation. He held that the trustees might buy a house in which the son could reside, but it must not be merely a family residence; it must be purchased with a view to advancing his prospects in the medical profession.

1. See *Lancet*, 1952, ii, 1077, 1078.
2. *Times*, Jan. 31, 1953.
3. *Ibid*, Feb. 7, 1953.

In England Now

A Running Commentary by Peripatetic Correspondents

WHAT struck me most at Canvey Island was how well all those concerned with rescue work or resuscitation had stood up to a long period of stress, anxiety, and lack of sleep. Their capacity for grappling with problems and for paying minute attention to detail seemed to be enhanced rather than diminished. The only sign of impaired efficiency I noticed was a tendency to loss of memory for recent events. For example, one very tired worker asked a doctor at least six times in a quarter of an hour if he was short of a particular article. But the prevailing mood inclined to elation, and unwarranted laughter was a common sign of strain. Appetites seemed to be bigger, and, not surprising to anyone who has served with the Armed Forces, enormous quantities of tea were consumed.

The psychological picture of the victims of this disaster was not unlike that of victims of the blitz. But their apathy was striking. Whether this was due to exposure and cold, a reaction to a state in which past and future are momentarily lacking in impact on the mind, or to some factor inherent in the flood experience itself, is a matter for conjecture. Some showed a tendency towards dissociation, and fastened an effect on to an emotionally indifferent object instead of the real source of grief. One mother, for instance, whose child had been killed bemoaned the loss of a new wireless set. A brittle brightness was quite usual, and I only saw one case of frank hysteria—a young man who quickly responded to sedation. It seems, however, that some of these people may need some form of abreaction. The disaster bore heavily upon the extremes of life, and I have carried away a vivid picture of the effect of a large bundle of comics and sweets being given to some children. The improvement in their general state was dramatic.

But one thing Canvey Island has done for me is to change completely my views about general practice. The work of the local doctors was impressive in its competence though many of them had worked non-stop without sleep for 48 hours. And their devotion to their patients was equalled by the confidence in which their patients held them. The therapeutic value of the very presence of these men, known and trusted, familiar faces in an unfamiliar world, was something which mere technical ability could not equal. This was not the time for bottles of medicine, letters to outpatient departments, nor applied psychology, but a striking reminder that, at any rate in some circumstances, and probably in more than most of us like to think, the man is more important than his methods.

* * *

So the longest and least loved month of the year has ended and no-one is sorry. December we tolerate because of Christmas and the few days snatched from our youth which it brings us. February we endure because it is short and, even more, because it is the forerunner of spring. But January has nothing. As one of my patients from her wisdom of 96 years remarked: "It seems longer than it is because we tack on the last few days of December to its beginning." And come to think of it we do. There are the carols and turkeys and all the festivities of Christmas Day, followed by the distended tummies and thank-you letters of Boxing Day. Then after a brief hiatus the shops reopen, all signs of Christmas gone and their windows full of their January sales. We think of our income-tax, our telephone and gas bills. We replenish the coal cellar, put anti-freeze in the radiator, and generally gird up our loins and prepare for the worst. When the New Year at last appears Christmas seems months away, and in our own minds we are well on with the winter. Then comes the snag: January has still 31 more days to run. We realise once again that figures lie and that whatever the calendar says the first month of the year is as ever twice as long as any of its fellows.

* * *

A professional call at the nurses' home is a formal affair. When I am wanted, a duly authorised person notifies my office. Plenipotentiaries then negotiate until they agree on a mutually convenient quarter of an hour—

no easy matter in a packed day. A minute or so before I am due, I cross the frontier and advance briskly down the long corridor. In the distance I can see two sisters standing at attention in the open doorway. I bow to each, the sisters about turn, I take my place between them, and the three of us march in step along the deserted labyrinth. At the bedside we converse for the first—and last—time, finally agreeing on the most appropriate number of aspirins. The procession re-forms and the sisters see me to the door, once more standing at attention until I am safely outside the three-mile limit.

This ritual, so orderly and dignified, needs only a few touches to rival more famous ones, such as the ceremony of the keys or the admission of a bishop to his cathedral. With these in mind, I have proposed certain amendments to the management committee. According to my suggested protocol, the physician wears the scarlet gown of a doctor of medicine. Three smart taps with a wooden stethoscope on the home door initiate the following dialogue. "Who knocks there?" "The doctor." "Whose doctor?" "The nurses' doctor." "Come in, doctor!" The doctor raises his velvet hat thrice, the sisters curtseying each time in reply. To round things off, the patient makes a show of resistance (as well she might) when the procession enters her room. These proposals incorporate all that is best in our public life, and with the committee's approval I shall seek a *fiat* from the Court of Claims. After all, everything has to begin some time, and the sooner this does the better.

* * *

H.M.C. Secretary answering a question about a proposed new nurses' home: "The committee will be glad to know that the nurses' home at.....hospital is in the pipe-line at the Regional Board."

* * *

Sometimes we wonder whether the good old days of the last century were a better proposition than the days of 1953 and whether we really work as hard today as did our forefathers. I thought I did and expected at least a modicum of sympathy when I remarked last evening in what I hoped was a casual tone that 20 to 30 visits a day did seem a trifle much even for January. But my elderly uncle's reply rather shook me. He had often wondered, he said, what I considered a heavy visiting-list. 70 or 80 used to be his quota for a day and sometimes it was up to 100. And he examined his cases. But of course when he was a G.P. doctors started their visits before breakfast, going on steadily (stopping, I suppose, though he did not mention it, for meals, surgeries, and such-like luxuries) till nightfall. Truly those giants of yesterday were tougher than the puny medicos of today. But, if he is right, the N.H.S. patient of today is better trained than his grandfather. When I put up my feet and relax at what I hope is the end of a busy day I can thank God and the health service that I haven't 70 to 80 patients still awaiting my arrival. Perhaps that thought will help me when I am wakened at 3 A.M. by the phone to hear an old body telling me that her bed is full of ants and will the doctor do something about it. But somehow I don't think it will.

* * *

MRS. BUNDLE

You felt you'd like an overhaul:
Rather than trouble me to call
You'd come to me instead.
When half-way here you wondered ought
You ever to have come and thought
Of going back to bed.

But, though it might be tempting fate,
You struggled on and got here (late)
And talked an awful lot.
You never dreamt that I would ask
You to undress—an endless task—
You like to wrap up hot.

What you had doffed you had to don.
I found with half my morning gone—
Precisely nothing wrong.
When next you need an overhaul
Please stay in bed and let me call—
It won't take half so long.

Letters to the Editor

REGISTRATION OF FEVER NURSES

SIR,—As an administrator and clinician connected with an isolation hospital which since 1938 has enjoyed the approval of the General Nursing Council as a training school for fever nurses, I should like to draw attention to the recent regrettable decision by that body to enforce, as soon as possible, the ban on the training of student nurses for the Fever Register.

The requirement of the General Nursing Council in respect of hospitals to be approved as training-schools for nurses was originally a minimum of 100 beds; but this standard was raised in 1947 to a minimum daily average occupation of 100 beds, except in fever hospitals where it was found that owing to the decline in the number of cases of infectious disease the requirement could not everywhere be implemented. In 1949 the General Nursing Council first expressed the wish that entries to training for admission to the Register for Fever Nurses should cease as soon as possible, although no inquiries were then made regarding those fever hospitals which could attain the required minimum, daily occupation of 100 beds.

In the particular hospital with which I am associated the daily average occupation of beds has risen from 66 in 1938 to 112 in 1952, and the total annual admissions from 700 to 1264. Yet the management committee has been informed that student nurses must not be accepted after the end of 1953, and that training of student nurses for the Fever Register must be terminated four years thereafter. As far as I am aware, the General Nursing Council has taken this final step without consulting those concerned in the fever hospitals recognised as training-schools, and apparently without a sense of the irreparable harm which might be done to the nursing and hospital services of the country. It has been suggested that the nursing experience available in infectious-disease hospitals should be used to enrich the training of student nurses from general hospitals. In the hospital group to which I am attached this has been the practice for two years, the student nurses serving for one period of three months in the infectious-disease wards as part of their general training; but in no way can this be considered equivalent to the longer training of the fever nurse. It has only been possible to carry on the fever hospital by having a large staff of student nurses in training for the Fever Register, and the staffing problem of the isolation hospital cannot be solved by this short period of fever nursing included in the general training of nurses. The position might be easier if the General Nursing Council were to decide that fever training should be a compulsory component of the syllabus of training for general nursing, but this decision is not likely to be made. There is no suggestion that fever training and registration might continue as a postgraduate accomplishment of the general-trained nurse—a course which might also help to solve the problem, and would be much more acceptable and fruitful than the suggested inclusion of fever nursing in a scheme of training for assistant nurses.

This attitude to the training of students in a branch of nursing which has a technique all its own would imply that there is something inferior in the fever-trained nurse. In the opinion of many clinicians and hospital matrons the fever-trained nurse is a highly valued member of the profession. Fever training is essential for the ward sister in charge of a ward for infectious diseases and for the senior nursing staff of an infectious-disease hospital. It is an extremely valuable asset to sisters in charge of tuberculosis and children's wards, and it should be essential for the health visitor engaged in making epidemiological inquiries and giving

advice on the domestic care of the infectious diseases commonly nursed at home.

Although there is little difference in the health conditions north and south of the Border, it seems that the Scottish General Nursing Council intends to continue the registration of fever-trained nurses. It may be that the future gaps in the English nursing service will have to be filled by the importation of fever-trained nurses from Scotland, or alternatively that nurses from England will have to travel northwards to secure acknowledgment of this valuable branch of nursing experience.

Although the common infectious diseases are in a period of decline, the threat of their renewed prevalence must always remain. The ever-present possibility of smallpox or typhoid fever in widely spread epidemics, the potential renewal of virulence in some of the common infectious diseases, and the present prevalence of virus infections such as poliomyelitis call for many nurses trained in handling infectious diseases. In a very few years the reserve of such nurses will be seriously depleted —a position which should cause the utmost concern to all those responsible for the health of the people.

JAMES GRANT
Medical Officer of Health and Medical Superintendent, Sheriff Hill Infectious Diseases Hospital.
Gateshead.

SIMULTANEOUS AORTIC AND AXILLARY EMBOLISM

SIR,—Mr. Hardy and Mr. Noon are to be congratulated on their skilful management of their quite remarkable case of aortic and axillary embolism. Their discussion of the case (Jan. 24) will be of great interest to any surgeon who may be called on to undertake this operation. I should like to endorse all their points and also to venture one or two comments based on experience of 11 cases of peripheral embolism, including 4 cases of aortic embolectomy in 2 of which the patient recovered from the operation.

Certainly extreme care and gentleness is essential in handling and sewing vessels smaller than the aorta. Although extrusion of the embolus and clot by milking is to be preferred to endarterial manœuvres, there are occasions when clot remote from the exposed vessel requires removal by suction. I found my ball-ended needle more effective than a catheter for this purpose,[1] and it has since been valuable on several occasions. In aortic embolectomy it is an advantage when possible to have one assistant in control of the aorta and another standing between the abducted legs in control of the common iliac vessels.

I believe it is very important during the first three to four postoperative days to use all proved methods of relaxing vascular spasm and increasing the collateral circulation. In addition to those mentioned by Mr. Hardy and Mr. Noon, including the valuable technique advised by Mr. Kinmonth,[2] I believe that lumbar sympathetic block should be done twice daily and also an intra-aortic injection of papaverine given in saline. This injection can easily be carried out at the same time as the left paravertebral injection.

This treatment results in noticeable improvement in the limb circulation, and has been used in 2 cases of femoral embolectomy in the last two months. In the late case of femoral embolism these and other measures, such as the oxygen tent, may contribute to the saving of a limb.

One last point of interest is that I have injected at laparotomy 5 ml. of 10% phenol along the lumbar sympathetic chains through the posterior peritoneum in some elderly patients who have also been suffering from the effects of senile obliterative arteritis of the lower limbs. This simple procedure has given effective sympathetic release, and it may therefore be worth while in cases of aortic embolectomy.

Whipps Cross Hospital, London, E.11. D. LANG STEVENSON.

1. Stevenson, D. L. *Lancet*, 1938, i, 723.
2. Kinmonth, J. B. *Brit. med. J.* 1952, i, 59.

POLIOMYELITIS

SIR,—I agree with Professor Trueta in his comments (Jan. 31) on your abstract (Jan. 10) of Dr. Ritchie Russell's book. I am interested in Dr. Ritchie Russell's views on the defects of prolonged hospital treatment, but feel that he is not just in his assessment of orthopædic practice.

Anterior poliomyelitis remains an enigmatic disease despite the work done during the past half-century. Ritchie Russell has emphasised the need for fresh and unbiased inquiry into all its aspects. While the approach with an open and inquiring mind is valuable, weight should be given to the experience of those who have been concerned with the long-term treatment of the disease for many years. A certain school of orthopædics has unjustly been blamed for advocating rigid splintage, but it is certainly true that in the past, for a reason that no longer applies, the older orthopædic teachers did prolong immobilisation unnecessarily when the acute illness was past. This practice derived largely from the view that if structure was preserved functional restoration would be facilitated. Certainly by these means they prevented the ghastly deformities which developed in the absence of any treatment.

This conflict between the claims of structure and of function has lasted for at least two centuries since John Hunter (quoted by Wood Jones) stated that "it is a vain quest to attempt to solve any of the problems connected with living organisms by studying only one of the twin factors that constitute the basis of life." If we could only regard function as, so to speak, the fourth dimension of structure many therapeutic problems would be easier.

The following are some of the disturbances which cause disability in poliomyelitis. I find it impossible to distinguish the precise contribution of each to structural or to functional disability, because they are inseparable. The most important feature is that which Steindler calls myogenic contracture, and to this the following contribute:

1. *Muscular disuse and reciprocal over-action.*—The weakness of affected muscles and the over-action of antagonists as a cause of deformity is less often seen nowadays, except in untreated poliomyelitis. It probably is less important than other factors.

2. *Muscle spasm.*—This is a transitory phenomenon, the cause of which is not clear. It has been found in partly paralysed muscles as well as those relatively unaffected, but is absent in totally flaccid muscles. It has been ascribed to local irritability of muscle tissue, a myositic element, or various types of neuroanatomical disturbance.

3. *Muscular atrophy and fibrous replacement.*—These changes that follow denervation appear to be the same as those in the later stages of badly treated peripheral-nerve injury. In poliomyelitis such degenerative changes are diffuse and variable in intensity. They would seem to be due to changes in elasticity, which normally is a quality of the non-muscular connective-tissue elements of muscle.

4. *Osteomyotatic aplasia.*—This factor operates only in childhood. The term is, perhaps, cumbersome. By it I mean the failure of the normal stimulus to muscle-fibre growth. According to the work of Wheeler Haines, the length of muscle-fibres is determined by the extending force of growing bone. Such an influence on deformity is, I think, evident in calf-muscle paralysis, where the absence of an upward distracting influence by the os calcis prevents the growth of the plantar muscles. Relative shortening or aplasia of this type in functioning muscles may contribute to talipes calcaneus and paralytic scoliosis. This is not a question of muscular over-action but of failure to grow in length.

5. *Disorders of muscular rhythm and of gait, and trick movements* are related to the defects of muscle power, over-action of antagonists, myogenic contractures, and the influence of extrinsic forces, including gravity and peripheral fixation of limbs. The variations in muscular torque in response to gravity, acceleration, and deceleration; the association of the paradoxical effects of peripheral fixations; and synergic inhibitions—these together form a problem of the utmost complexity in the diffuse and often incomplete palsies of poliomyelitis.

There are other function-structure derangements:

(*a*) *Pseudo-arthritis*, as described by Poynton and others.

(*b*) *Vascular disorders* of whole regions, which are well known to contribute to limb shortening and defects in skin, and which presumably contribute to the muscular defects already noted.

(*c*) The combined effect of *extrinsic forces and intrinsic defects*, causing secondary distortions in bone and derangements of articular tissues.

These problems do need further study, but special poliomyelitis centres are not required. Coöperation by teams including a physiologist, neurologist, physiotherapist, and nurse with the orthopædic surgeon in existing orthopædic centres is the ideal approach, which could be readily achieved.

Exeter. NORMAN CAPENER.

MORE FOOD

SIR,—In his letter (Jan. 24) Dr. Bender says that he finds it difficult to imagine any reward sufficient to attract a farmer to marginal land. But I know a hard-working farmer for whom there is more than one: a marginal farm can be made to pay financially (though it may not be easy), but far more rewarding is seeing the improvement in land, crops, and head of stock which can be carried, and hearing neighbours and visitors remark on this improvement. Oil lamps are still used; but the enjoyment and satisfaction of doing a worthwhile task well is, in this case at least, a great part of the reward; and the amenities of a civilised life are not necessarily those found in cities.

Edinburgh. J. A. WATT.

ŒSOPHAGEAL CONTRACTION AND CARDIAC PAIN

SIR,—Your issue of Dec. 6 contained the St. Cyres lecture delivered by Dr. William Evans a few months previously.

Having attended his lecture and disagreed profoundly with his statements, I have since carried out investigations into the frequency of reflux of barium within the œsophagus, as my own conviction was that this was not pathological and was, in fact, common.

The first three young subjects examined at a barium-meal session showed reflux within the œsophagus; this appears to occur when the diaphragm in inspiration occludes the lower end of the œsophagus, and when that occlusion is more powerful than œsophageal peristalsis. The reflux, in fact, occurs by relaxation of the œsophagus, and there is never at any time any suggestion of retrograde peristalsis.

In the course of an investigation being carried out to elucidate the earliest signs of hiatus hernia, the "œsophageal arrhythmia" described by Dr. Evans has been observed in a very large number of patients; it seems to take place in at least 50% of normal subjects. There can be no doubt that this feature is entirely physiological, and in no instance so far encountered has it been associated with "cardiac-like" pain.

The reflux is found most usually in patients with a demonstrable phrenic ampulla; and this latter appearance seems also to be related to the efficiency with which the diaphragm occludes the lower end of the œsophagus.

Diagnostic Radiology Department,
St. Bartholomew's Hospital,
London, E.C.1. R. A. KEMP HARPER.

PRACTICAL PENICILLIN

SIR,—As one of the general practitioners in whose practice Mr. Cohen carried out part of his investigations, I was interested to read his report (Jan. 24) and the letter from Dr. Ryle (Jan. 31).

The regimen introduced by Mr. Cohen has been continued here in this practice; and my partners and I can vouch for the efficacy of a large single dose of 'Distaquaine Suspension' in many of the cases of sepsis encountered in our daily work. In addition, there is no doubt that this method simplifies treatment and saves time and trouble to our patients and to us.

Mr. Cohen is obviously the best man to reply to Dr. Ryle's several points, and I have no doubt that he will; but as he is now permanently resident in Suva, Fiji, there will probably be some delay.

Liverpool. J. SYTNER.

BOVINE TUBERCULOSIS AND HUMAN TUBERCULOSIS

SIR,—Dr. Bradshaw (Jan. 31) refers to the mistakes in my figures (which have been corrected), and says that they call in question the accuracy of the remaining data. I should like to say that a copy of the *Veterinary Record* which contained these data was sent on Aug. 17, 1951, to each of the medical officers of health who had supplied me with figures; none of them reported any inaccuracy or disagreed with my deductions. I hope that medical officers who have followed this correspondence will say so if I am wrong.

Dr. Bradshaw says that "immunity to tuberculosis can be produced by certain types of living mycobacterium." Will he give me evidence of this, and explain why it is not generally applied? He adds: "dead organisms or bacterial products have never been shown to produce immunity." What does he think about London, where practically all of the milk is heat-treated and comes mainly from non-designated sources, and where, on the whole, tuberculosis is much less serious a problem than it is in the counties of Scotland with a very high proportion of cattle attested?

Dr. Anderson (Feb. 7) says that I have made "the mistake of estimating the incidence of pulmonary tuberculosis from notifications statistics."

I have said that the eradication of tuberculosis from cattle leads to an increase in pulmonary tuberculosis in human beings: for, taking Scotland as a pattern, out of 11 counties with a high proportion of cattle free from tuberculosis, 10 show such an increase—some a very big increase. Out of 11 counties with few uninfected cattle, 10 show a very considerable reduction in human notifications. This broad average seems to confirm my view.

Dr. Anderson mentions county health authorities as advising attestation of dairy herds: I think he is confusing "attested" with "tuberculin-tested," for local authorities play no part in the formation of attested herds. The granting of a "tuberculin-tested" licence is certainly the province of the local authority, but an "attested-herd" certificate is granted by the Ministry of Agriculture. An attested herd is a herd in which all the animals have given a negative result to 3 consecutive tuberculin tests. After 1954, only milk from attested cattle may be designated as tuberculin-tested.

Turning to "the uncertain remote benefits of drinking tuberculous milk," tuberculosis of the udder, and so of the milk, is an extremely rare condition in cows. By contrast, the milk of cattle free from tuberculosis contains none of the antibody substance, and the drinking of it makes human beings highly susceptible to the human bacillus and to pulmonary tuberculosis. Incidentally, non-pulmonary tuberculosis is commoner in English counties with a high proportion of attested cattle. Finally, the risk of a milk-borne infection (which can be eliminated by heat-treatment) is much less than that of a certain increase in notifications of pulmonary disease where the cattle are free from tuberculosis.

High Wycombe. L. PITCHER.

AUGMENTED RESPIRATION

SIR,—Dr. O'Brien, in his letter (Jan. 31), questions the value of our method of treating atelectasis neonatorum on the ground that other "less ingenious" methods of artificial respiration have persistently failed. This is not good logic, and he can hardly advocate the abandonment of further attempts to meet this most serious emergency.

Experimental work by Day et al., to which he refers, has shown that full-term fœtal atelectatic lung can be satisfactorily inflated; and Dr. O'Brien misrepresents the purport of this important article. They failed, however, in the case of gross structural immaturity. In the case of hyaline membrane Potter could not re-expand affected lung post mortem with air, nor do we yet know whether this condition is reversible in the living subject.

Recently Dr. O'Brien and Dr. Roberts[1] described resuscitation of the newborn by intermittent positive endotracheal inflation. The usefulness of this method in the immediate treatment of asphyxia in full-term infants has long been generally accepted since Gibberd and Blaikley first introduced it. Nevertheless the danger of overdistension of the alveolar ducts likewise applies. As described by O'Brien and Roberts, however, oxygen, delivered at $1^1/_2$ litres per minute, is intermittently supplied at an empirical rate which bears no relation to the child's requirements or spontaneous efforts, if any, and at pressures which are neither accurately determined nor controlled.

Dr. O'Brien suggests that our treatment not only fails to assist a baby in breathing but even accelerates the development of factors responsible for atelectasis. This criticism is no more than conjectural and is not based on observations comparable to our own with the servo respirator in action. He alludes to the possible fate of normally aspirated liquor amnii, but if a baby can be kept alive and breathing it has a chance of dealing with this in the physiological manner. Our use of negative pressures is also likely to improve circulation by encouraging rather than opposing venous return to the heart.

We believe that it often takes several hours of treatment to overcome atelectasis by gradually assisted expansion; and we have, in the past, from time to time failed to save the child by stopping treatment too soon after witnessing clinical improvement. Since our article appeared, two further severely affected cases, in which the prognosis appeared very grave, have been successfully treated in the servo respirator and are doing well.

We did not state, as represented by Dr. O'Brien, that atelectasis found at necropsy is unrelated to the ante-mortem state; but we produced instances to show that, in some cases, total non-aeration of the lungs may be found post mortem where evidence of at least some degree of aeration has been present before death—an observation already made by Potter.

Our trip spirometer is calibrated on each occasion it is used by means of pumping air into it with a well-lubricated 10 ml. syringe, using the same non-return valves. Mask leaks are tested for by gently compressing the sides and observing pen deflection. The alginate seal, when used, forms a far more natural and complete seal than any inflated cuff; and, provided it is not being subjected to pressures, it permits the minimum of leakage. For many months now we have taken the precaution of switching off the respirator pressures for the taking of recordings.

We do not claim the accuracy of a physiological experiment and have already listed the limitations of the method, many of which are due to the mechanics of the writing pens; but plans to improve these defects are already well under way. As it is, the method, though rough and ready, is simple, can be operated by a nursing sister, and causes the minimum of disturbance to a sick child.

Basal conditions are not applicable in the face of respiratory distress, and maximal respiratory capacity is more indicative of the child's ability to survive. It would be wanton to forgo any contributory information, thus available, in making a clinical assessment; and Dr. O'Brien's objections ignore the practical needs of the case.

Let us not widen the existing gap between scientific experiment and clinical reality.

Institute of Obstetrics and Gynæcology, Postgraduate Medical School of London, W.12. IAN DONALD
JOSEPHINE LORD.

1. O'Brien, D., Roberts, H. *Brit. med. J.* 1952, ii, 963.

TUBERCULIN SENSITIVITY

SIR,—Having been ill for some time, I have only now been able to study the intriguing paper by Dr. Edwards and Dr. Palmer (Jan. 10). They claim that "low-grade" tuberculin sensitivity is non-specific, and they repeat this postulate so clearly in their article that there is no doubt they mean it is *always* non-specific. Prior to discussion of this surprising postulate, there is one question which I think they should answer.

Do they believe that, after a first tuberculous infection, specific skin allergy will invariably remain at what they term a high level throughout life, regardless of whether the focus heals or not, and even if the individual never undergoes a further infection? If they believe this, what are the grounds for their belief? To put it more directly, do they disbelieve that after a first tuberculous infection, and in the absence of further infection, specific cutaneous allergy may through the months and years gradually wane to a very low level? For if it does so wane, surely it must pass through a stage of reacting only to high doses of tuberculin and so constitute "low-grade" sensitivity within their definition.

Tuberculosis Research Unit, M.R.C. Laboratories, Holly Hill, London, N.W.3. MARC DANIELS.

EFFECTS OF A SEVERE FOG ON A GENERAL PRACTICE

SIR,—I was interested to read Dr. Fry's article in your issue of Jan. 31. The figures given by him concerning the increase in the volume of work surprised me in more ways than one.

Firstly, an increase of 50 cases a week in a practice of 4500 indicates that only slightly more than 1% were affected as a result of the fog. This is a comparatively trivial figure compared with a similar occurrence in my practice two or three years ago when the volume of work increased to such an extent that I attended 45% of my entire list (2600) in a week.

Secondly, I am surprised at the relatively small amount of work indicated as normal for the practice concerned. Dr. Fry's figures show his yearly items of service as approximately: visits 3900, attendances 13,000; total 16,900. My own figures for a practice of 2600 people show the following: visits 11,900, attendances 18,700; total 30,600. In other words Dr. Fry's rate of remuneration per item of service is approximately three times mine. Can you, Sir, offer any suggestions as to how this great disparity arises?

Whitburn, co. Durham. FRANK CORT.

*** This letter has been shown to Dr. Fry, who replies as follows:

"The main purpose of my short report on the effects of the severe London fog was to show what type of clinical material was encountered during the period. It was *not* my intention to show how much or how little work my practice entailed during a year. This has been discussed in a previous report.[1]

"It is, I believe, quite impossible to judge the worth and quality of a practitioner by the volume of work that he does. Obviously this volume will depend on very many factors, such as (1) the type of practice and the nature of the diseases

1. Fry, J. *Brit. med. J.* 1952, ii, 249.

affecting the patients, and (2) the practitioner and the way in which he conducts his work—a personal and individual matter which each G.P. will work out for himself.

"Dr. Cort is surprised at the relatively small amount of work which my practice entails. In turn I am astounded at the figures which he quotes for his practice. In my practice over the past four years the average attendance-rate per patient per year has been 3·5. This compares with figures of 4·1 from a semirural practice,[2] 5·7 from a rural practice,[3] and 5 from the Social Survey unit.[4] Prof. Bradford Hill [5] also quotes a figure of 5 for National Health Insurance patients in 1938, while the Ministry of Health at an inquiry in 1937 gave a figure of 3·66. Thus the average number of attendances per patient per year seems to be between 4 and 5. Yet Dr. Cort, with 30,600 attendances for 2600 patients, gives a yearly attendance-rate of 12.

"Assuming that Dr. Cort works six days a week in a year, it can be seen that he does an average of 40 visits a day and sees some 60 persons in his surgery. If he works rapidly, at a rate of five minutes for each surgery consultation and ten minutes for each visit, this volume of work will necessitate some twelve hours' work daily. He says that two or three years ago he attended 45% of his entire list (2600 units) in a week. This means that in one week he attended to 1170 of his patients at a rate of 167 a day for seven days a week, necessitating some nineteen and a half hours' work a day (excluding meals and other personal essentials)."

An editorial comment will be found on p. 332.—ED. L.

ACROMEGALY AND NEUROFIBROMATOSIS IN SISTERS

SIR,—The following is a record of two sisters, one of whom suffered from acromegaly and the other from neurofibromatosis (von Recklinghausen's syndrome).

A woman, aged 65, was admitted to Bootle Hospital with symptoms of intestinal obstruction and with dysuria. In addition she had advanced acromegaly with prominent jaw, large tongue, big hands and feet, and hirsuties. Her general condition was poor and she was emaciated. A large mass was detected in the pelvic colon, and there was gross pyuria. Other preliminary investigations showed a blood-sugar level of 300 mg. per 100 ml. (but no glycosuria) and a blood non-protein-nitrogen level of 36 mg. per 100 ml. Radiography of one hand showed typical acromegalic changes, but the pituitary fossa was within normal limits.

Her sister, aged 61, with whom she lived, was noticed to have extensive neurofibromatosis involving the face, neck, and arms (and probably elsewhere) in association with areas of pigmentation. This sister was feeble-minded and extremely apprehensive. She would not allow detailed clinical examination, and permission to take photographs of either of them was refused.

While investigation of the acromegalic sister was proceeding she suddenly vomited, appeared to aspirate most of the vomit, became cyanosed, and died in asphyxia. Necropsy showed a large adenocarcinoma of the descending colon, pyelonephritis, and cystic degeneration of the anterior pituitary.

The coincidence of acromegaly and neurofibromatosis is well known. Sternberg [6] in his early monograph on acromegaly states: "Mollusca fibrosa of various sizes especially on the face and eyelids is frequent," and he cites nine reported instances. More recently the association of these two disorders has been described by Ormond,[7] de Castro,[8] Barber and Shaw,[9] and others. Although in both syndromes a familial tendency is recognised, this is, so far as I can ascertain, the first time that acromegaly and neurofibromatosis have been recorded in siblings.

Liverpool. D. BLAIR MACAULAY.

2. Watts, C. A. H. Personal communication.
3. McGregor, R. M. *Edinb. med. J.* 1950, **57**, 433.
4. Stocks, P., Sickness in the Population of England and Wales in 1944–47. Studies on Medical and Population Subjects, no. 2. General Register Office, London.
5. Hill, A. B. *J. R. Statist. Soc.* 1951, **114**, 1.
6. Sternberg, J. Acromegaly. London, 1899.
7. Ormond, A. W. *Proc. R. Soc. Med.* 1919, **13**, *Sect. Derm.* 124.
8. de Castro A. *Rev. neurol.* 1934, **1**, 39.
9. Barber, H. W., Shaw, M. *Proc. R. Soc. Med.* 1922, **15**, *Sect. Derm.* 30.

ISOSPORA BELLI (WENYON) FROM DUODENAL INTUBATION

SIR,—Despite the fact that we have encountered numerous cases of coccidiosis in man [1] the site of infection remains unknown. The condition seems to be self-limiting and has not, in our hands, come to necropsy; so the exact source of the oocysts we observe in the stools remains in doubt.

Recently we had a patient with nephritis who was passing in the stool an exceptionally large number of oocysts of *Isospora belli* and had passed a solitary *I. hominis*.

A duodenal tube was passed on two occasions, and the stomach and duodenal contents submitted to zinc-sulphate flotation. On the first occasion oocysts of *I. belli* were found in both the duodenal juice and the somewhat bile-stained gastric contents. The tube was passed on a second occasion, and this time the first specimen of gastric juice contained no oocysts that we could find. The duodenal fluid, and a second suction of gastric contents—this time bile-stained—both showed oocysts of *I. belli*.

The finding of the parasites in duodenal fluid suggests that the site of infection may be the duodenum or bile-tract. A large proportion of the oocysts seen were in the two-sporoblast stage—a fact difficult to reconcile with our usual experience with *I. belli* in which, in contradistinction to *I. hominis*, the parasites are immature on arrival in the stool. There may be some development in the deeper tissues, such as occurs with *I. bigemina*.

Our thanks are due to Dr. J. C. Thomas, Provincial pathologist, Natal Provincial Administration, for laboratory facilities; and to Dr. N. R. Pooler and Dr. A. L. Brown for access to the case.

Amœbiasis Research Unit, South African Council for Scientific and Industrial Research/Natal Provincial Administration, Durban.
R. ELSDON-DEW
G. G. ROACH
L. FREEDMAN.

"GOLF BACK" AND THE NEW SWING

SIR,—Is the modern golf swing liable to produce lame back?

The movement is essentially a long swing with a braced left arm, the left wrist being "locked" by showing three or four knuckles. It employs the fullest body-shoulder pivot with the trunk held much more erect than in the traditional method, from which, essentially, all wrist-rolling action is deleted.

No less an authority than Mr. Henry Cotton alleges that the new swing contributes to a growing number of players with injured backs,[2] and he regards its teaching as a bad discipline. In America, where this technique is most widely used, a number of top-ranking professional golfers have been disabled by what is popularly described as "slipped disc," while in this country there have been similar examples of "golf back"—notably the case of Mr. Harry Weetman. The questions therefore arise whether the modern swing is unphysiological, and whether golf back is in fact more prevalent today among those who use it.

Having recently acquired this technique at the hands of Mr. Max Faulkner, who is perhaps its leading exponent in this country, I regard the movement as no more and no less unnatural than the traditional swing. And I think we should be very cautious about accepting the contention that it is more liable to cause disability. Lame back has always been recognised as an affliction of golfers, though usually a transitory one. And while the nature of this disability has defied precise analysis, it is probably fair to say that the popular notion that most examples are due to "discs" is incorrect. Any golfer in middle life (or for that matter any athlete of like age) who suddenly changes the execution of a

1. Elsdon-Dew, R., Freedman, L. *S. Afr. J. clin. Sci.* 1950, **1**, 185. Elsdon-Dew, R., Freedman, L. *Trans. R. Soc. trop. Med. Hyg.* (in the press).
2. *News of the World*, Dec. 7, 1952.

certain movement, thereby pressing into activity unhabituated muscle groups, is probably being imprudent and facing risk. Accepting this proviso, there seems to be no good reason why the new swing should not be practised, since it is a pleasure to execute and gives the golfer more power and control.

In view of the new provisions for promoting golfing prowess in the young, it would be useful to know how far (if at all) the objections to the new swing are well founded.

London, W.1. MICHAEL ALBURY.

EXPECTATION OF FURTHER DURATION OF LABOUR

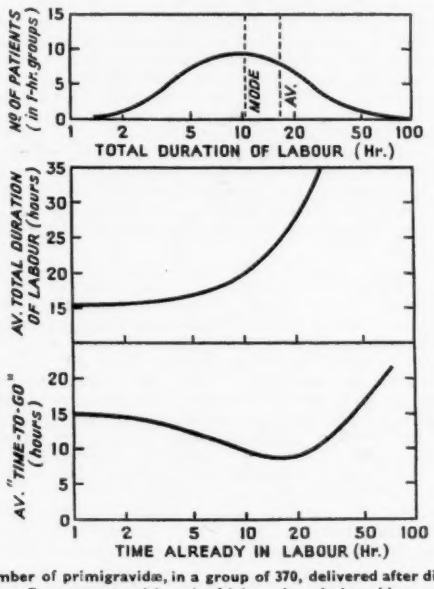
SIR,—In deciding on treatment in cases where labour is proving to be slow, it would be helpful to know the average further duration of labours in like circumstances. Averages must take account of such factors as the strength and frequency of uterine contractions, the rate of dilatation of the cervix, minor degrees of disproportion, and unusual presentations. Data are still insufficient for full sets of figures; and, moreover, the values are probably specific for a given location and epoch. Values can, however, be prepared for various parities, and the curve reproduced in the accompanying figure is for primiparæ.

Curve 1 shows the number of patients delivered after labours lasting for various times. The figures were collected from a group of 370 normal deliveries by counting the patients in each 1-hour group. The modal value is 10 hours, but the average value is higher than this (16 hours) owing to the inclusion of long pathological labours. This curve is similar to those published by Busby.[1]

Curve 2 shows for various times the average length of labour of all patients still undelivered at a given time. It commences at 16 hours and rises to 28 hours' total labour for all patients undelivered after 20 hours.

Curve 3 shows the average "time-to-go." It is obtained by subtracting the time already spent in labour from the figures of curve 2. Time-to-go has an average at the start of labour of 16 hours; after 10 hours the further expectation has fallen to 10 hours; there is a minimum expectation at 16 hours of a further 8 hours; and after this the curve rises steeply owing to the large percentage of pathological cases in the remaining patients.

1. Busby, T. *Amer. J. Obstet. Gynec.* 1948, **55**, 846.



A, number of primigravidæ, in a group of 370, delivered after different times. B, average total length of labour in primigravidæ, according to time already in labour. C, average further duration of labour in primigravidæ, according to time already in labour.

This graph emphasises the need for early action to prevent long labours. A primigravida who is still in the first stage of labour after having regular contractions for 16 hours needs to have her case carefully reviewed.

Obstetric Hospital,
University College Hospital,
London, W.C.1. C. N. SMYTH.

THE MEDICAL SERVICES IN THE KOREAN WAR

SIR,—The letter from General Sir Neil Cantlie last week adds little to the report by your correspondent on Jan. 17. Your correspondent stated: "Our own units have continued to use plasma as the chief means of replacing colloids and electrolytes in initial treatment." He also added: "The Americans have depended more on fresh blood."

In my previous letter (Jan. 24) I pointed out that during the late war, when ample supplies of blood and plasma were available, experienced workers in the forward areas used more than twice as much blood as plasma. Apparently this is also the practice of the American medical services today. It is difficult to understand why it is not also the practice of the Commonwealth medical services, and, in the absence of any explanation, one is regretfully forced to the conclusion that blood is not as readily available to the Commonwealth medical units in Korea as it should be.

Hove. REX BINNING.

Parliament

Hospital Endowments (Scotland) Bill

IN the House of Lords on Feb. 5 Earl FORTESCUE, on behalf of the Earl of HOME, Minister of State, Scottish Office, introduced this Bill, which provides for the constitution of a Scottish hospital endowments research trust. It also empowers the Hospital Endowments Commission to transfer endowments to the trust. The Bill is based on the recommendations of the Hospital Endowments Commission,[1] set out in a white-paper last August.

QUESTION TIME

Industrial Dermatitis Appeals

Mr. J. T. PRICE asked the Minister of National Insurance if, in cases of industrial dermatitis referred to medical appeal tribunals, the medical members appointed to adjudicate were in all cases qualified dermatologists.—Mr. R. H. TURTON replied: I could not accept the suggestion that medical appeal tribunals should always include specialists in the particular condition from which an appellant may be suffering. But in a case of dermatitis the evidence before the tribunal always includes a report by a dermatologist.

Mr. PRICE: Would the Minister not agree that it is considered by people well qualified to judge that in discussing or adjudicating upon these difficult cases the presence of general physicians who have no dermatological qualifications is quite useless, because these cases involve questions not only of disease but of medicolegal fact which has a bearing on the decisions made? Is the Minister aware that there is a good deal of disquiet about the manner in which these cases are being disposed of at the moment?—Mr. TURTON: The Ministry have not had such indications. There is general satisfaction with the decisions of the medical appeal tribunals, which consist of physicians of very great eminence. The adoption of any suggestion such as that made by the hon. member would involve a great delay in the treatment of these cases.

Tuberculosis among Women in Scotland

Replying to a question, Commander T. G. D. GALBRAITH, joint under-secretary of State for Scotland, said he was aware that for the 15–35 age-group in Scotland, contrary to the usual experience elsewhere in Europe, the female death-rate was higher than the male death-rate in the years 1948–50. This was due to the excess of female deaths from respiratory

1. See *Lancet*, 1952, II, 251.

tuberculosis, and the steps taken to combat that disease had frequently been described. With the greatly reduced tuberculosis mortality in 1951, the latest year for which detailed figures were available, the female death-rate fell below the male rate.

Replying to further questions, Commander Galbraith said the death-rate from respiratory tuberculosis among women between 15 and 35 years of age in Scotland had fallen from 149 per 100,000 in 1948 to 56 in 1951. The corresponding rates for England and Wales were 68 and 28. The precise reasons for the continuing disparity between the two countries were not known, but he saw no reason why the measures taken in recent years to combat the disease should not result in this disparity being further reduced in the near future.

Mental Hospitals' Staff

Replying to a question, Miss M. P. HORNSBY-SMITH stated that the deficiency of nursing staff in mental hospitals was now about 3500 men and 7600 women. In 1947, the first year for which figures are available, the deficiency was 2300 men and 7000 women. The numbers employed had increased since 1947 by 1200 men and 3800 women (counting part-timers as a half), but the needs had increased at a greater rate.

Registration of Opticians

Replying to a question, Mr. IAIN MACLEOD said that in conjunction with the Secretary of State for Scotland he proposed discussing the findings of the Interdepartmental Committee on the Statutory Registration of Opticians with the bodies concerned, with a view to preparing proposals to be laid in due course before the House of Commons. It should not be inferred that the Government accepted all the detailed recommendations of the committee.

Atmospheric Pollution

Replying to Mr. SOMERVILLE HASTINGS, Mr. HAROLD MACMILLAN said that as far as was known there was no reduction in the amount of sulphur dioxide emitted to the atmosphere when coal and coal products were burnt in slow-combustion stoves, but probably a little less smoke was formed from coal.

Obituary

ALAN STUART WHITEHEAD

M.D., M.Rad. Lpool, D.M.R.D.

Dr. A. S. Whitehead, consultant radiologist to the Eastern Hospital management group of the Liverpool Regional Hospital Board, died on Feb. 2 at the age of 36.

He was educated at King George V School, Southport, and the University of Liverpool, where he graduated M.B. in 1941 and was awarded the clinical exhibition in medicine. He acted as house-surgeon and house-physician at the Emergency Hospital, Southport, during 1941–42 and later he served in the R.A.M.C. He spent a short time in general practice before taking the post-graduate course in radiology at the University of Liverpool in 1947. In 1948 he was appointed registrar in the Royal Liverpool United Hospitals and later senior registrar at Broadgreen General Hospital and Mill Road Maternity Hospital. In 1949 he took the D.M.R.D. and the M.RAD. Two years later he became assistant radiologist to the Eastern Hospital group and last October consultant radiologist to Mill Road Maternity Hospital, Newsham Hospital, and Bootle General Hospital. He graduated M.D. last year. His published work included papers on Congenital Toxoplasmosis, Radiological Double Contour Effect, and Placentography.

P. H. W. writes: "Whitehead's advice was continually sought by his colleagues and they thought highly of his opinions which were so willingly given. Since his work was of such a specialised nature we invited him to help us with the postgraduate course in radiology: he freely gave his time to the teaching of the students and we could always rely on him to help with additional work. He will be greatly missed by all his colleagues in hospital and by the students. It is tragic that so young a life should be cut short at the beginning of a promising career."

Dr. Whitehead leaves a widow and two children.

EDWARD EDMONDSON PAGET-TOMLINSON

M.D. Camb.

Dr. Paget-Tomlinson, who died at Ulverston, Lancs. on Jan. 20, at the age of 70, came of a Westmorland family. He was the son of W. S. Paget-Tomlinson, F.R.C.P., who had retired from his Liverpool practice in 1890 on succeeding to the Tomlinson estates at Kirkby Lonsdale.

Edward Paget-Tomlinson qualified from the London Hospital in 1909, and after holding house-appointments there he took his M.B. Camb. the following year. For some time he practised at Malton, Yorks, later moving to Horncastle, Lincs, where he was appointed surgeon to the Horncastle War Memorial Hospital. He was also in practice for some years at Kirkby Lonsdale before he retired to Ulverston. During the late war he interrupted his retirement to act as medical officer to the A.R.P. service there, and he was a willing and valuable temporary helper in any local war-time emergency.

P. M.-B. writes: "P.-T., as he was popularly called in my early days at the London Hospital, represented a type of sportsman who sprang from Cambridge University—beautifully proportioned, clean in mind and clean in body, and an adept at every form of field athletics, excelling especially in the jumps and hurdles, but he was as keen on his work as on games. To him life was a series of grand and exciting experiences, for he delighted in all forms of plant and animal life. The picture of his cheerful, handsome face and his sincere manner has always remained with me. Equally charming and considerate to everyone in all walks of life, it is small wonder that his name became a household word wherever he practised."

JOSIAH OLDFIELD

M.A., D.C.L. Oxfd, M.R.C.S.

Dr. Oldfield, who died on Feb. 2 within a fortnight of his 90th birthday, brought into our own times the breadth and liveliness of interest of a Victorian amateur of reform.

He was born at Shrewsbury, the son of David Oldfield, and educated at Newport, Salop, Grammar School and Oxford University, where he took a second class in the honours schools of theology and law. Called to the bar at Lincoln's Inn in 1892, he practised in the Oxford circuit before beginning to study medicine at St. Bartholomew's Hospital, where he qualified in 1897. Shortly afterwards he founded, in the New Kent Road, the Humanitarian Hospital of St. Francis, of which he was for some time chairman and senior physician.

But medicine remained only one of his interests. In 1901 he was awarded the D.C.L. of Oxford University for his thesis on capital punishment, and in the same year he founded the Society for the Abolition of Capital Punishment. Though many thought his interests as a reformer were too diffuse, he went to great pains to collect first-hand information about the reforms he advocated, and in the winter of 1901 he visited India to study, in his own words, "the effect of the English Government on the people," and to try to discover "the reality of their grievances and at the same time to learn the cause of the modified success of the Christian Missions" there.

He had been partly drawn to medicine by his interest in dietetics, and in 1903 he became warden and senior physician to the Lady Margaret Fruitarian Hospital at Sittingbourne, Kent. He also practised as a consultant in digestive diseases. He had himself adopted the fruitarian diet while at Oxford, and he strenuously advocated its adoption "by the higher classes for æsthetic and humane reasons." He supported his theories by the practical method of planting fruit trees and by writing many popular books, including *Diet in Rheumatism*, *Diet in Digestion*, *Fasting for Health and Life*, and *Eat and Keep Well*, and he wrote many vigorous letters to the newspapers.

During the 1914–18 war he raised and commanded a field ambulance, and he held the rank of lieut.-colonel in the R.A.M.C. Soon after the war he continued the study of the effect of British government on subject peoples, which he had begun in India, by a tour of the West Indies, and during this visit he was admitted to the Jamaican Bar.

Even when he was in his 80's his work as a writer went on, and his books the *Mystery of Birth* and the *Mystery of Marriage*, were published in 1948 and 1949. During these last years he had made his home at St. Margaret's Hospital, and his impressive appearance and personality made him an object of veneration and awe to the local population of Doddington. He continued his consulting practice, and patients came to him from all over the country. He remained physically and mentally alert, and in 1951 he was in private correspondence with us on the implications of the Cassidy case and the Denning judgment, arguing very wisely that medical members of hospital staffs must be accorded full responsibility for their professional acts.

ARTHUR FREDERICK GOLDSMITH
M.R.C.S.

Dr. Goldsmith died on Jan. 27, at the age of 82, in Bedford, where he had been in practice for many years. His family had a long record of service in the town; for his father, Dr. G. P. Goldsmith, practised there for forty years and his elder brother, Dr. G. Harvey Goldsmith, was consulting ophthalmological surgeon to the Bedford County Hospital.

Dr. "Fred," after he qualified from St. George's Hospital in 1874, joined his father's practice. Much of his work lay among the poor, and his old patients still talk of his skill and never-failing generosity. When his father retired in 1904 he succeeded him as district medical officer under the board of guardians, and he was also appointed public vaccinator. Dr. Goldsmith was an enthusiastic church worker, and he was for many years a churchwarden at St. Paul's Church. After he retired in 1932 he and his wife at first lived in Cornwall, but some years ago he returned to Biddenham, near Bedford, where he died.

Births, Marriages, and Deaths

BIRTHS

ALEXANDER.—On Feb. 6, at Ellerburn, Nunburnholme Avenue, North Ferriby, East Yorks, to June Alexander, M.B. (née Tyson), wife of Gordon Alexander, M.B., D.PATH.—a son.

THOMPSON.—On Jan. 29, at Newcastle upon Tyne, to Dr. Margaret Thompson (née Swinburne), wife of Dr. R. B. Thompson, M.R.C.P.—a son.

Appointments

CANN, A. M. R., M.D. Lond., D.C.H.: senior M.O. (school health service), Kingston upon Hull.

CULLINGTON, D. E., M.A., M.B. Camb., D.C.H., D.P.H.: M.O.H., Barking, Essex.

EARLE, J. H. O., M.D. Lond.: consultant asst. pathologist, Royal Cancer Hospital, London.

FLEMING, A. CHALMERS, M.B. Durh.: deputy medical superintendent, Hortham Hospital, Almondsbury, near Bristol.

HILL, T. W., M.D. Glasg., D.P.H.: asst. school M.O., Middlesbrough.

JARRATT, GEORGE, M.B. Lond., M.RAD. Lpool, D.M.R.T.: asst. radiotherapist, Hogarth radiotherapeutic centre, Nottingham General Hospital.

LOVE, S. H. S., M.B. Belf., D.A.: consultant anæsthetist, Belfast H.M.C. group.

MINTO, C. N., M.B. Aberd., D.P.H.: M.O.H., Caithness, and district hospital officer, Northern Regional Hospital Board for Caithness.

O'REILLY, J. T. J., M.B. N.U.I., F.R.C.S.I.: surgeon, County Hospital, Waterford.

OWEN, R. G., M.R.C.S.: appointed factory doctor, Penygroes, Caernarvonshire.

SAVILLE, STEPHANIE, M.B. Dubl.: anæsthetic registrar, Bath group of hospitals.

WARRACK, A. J. N., M.B.E., M.D. Lond., D.T.M. & H.: consultant pathologist, City General Hospital Laboratory, Sheffield.

Colonial Service:

BOULGER, L. R., M.B. Manc.: pathologist, Nigeria.

DAVIES, C. W., M.R.C.S., D.P.H.: A.D.M.S., Tanganyika.

GOTTLIEB, KRYSTYNA, M.B., Polish School of Medicine, Edinburgh: schools M.O., Northern Rhodesia.

GREEN, BARBARA, M.B., D.T.M. & H.: senior M.O., Nigeria.

HARDY, J. M. H. R., L.R.C.P.E.: police M.O., Mauritius.

ROMBEJKO, EDWARD, MED.DIP. Warsaw: M.O., St. Helena.

Newcastle upon Tyne Regional Hospital Board:

LEGGAT, P. O., M.D. Aberd., M.R.C.P.: consultant chest physician (asst.), Newcastle (East) tuberculosis administrative area.

LYALL, D. J., M.B. Aberd., D.A.: consultant anæsthetist (asst.), Tees-side H.M.C. group.

MCDONALD, ROBERT, M.B. Aberd., D.P.H., D.P.M.: consultant psychiatrist, St. George's Hospital, Morpeth, Northumberland.

Notes and News

THE APPEARANCE OF ANIMALS

SWIFTLY reviewing the different shapes, patterns, and colours of various forms of animal life, Professor Portmann[1] lays emphasis on the facts that: (1) the external appearance is no guide to the internal (external symmetry often hides internal asymmetry); (2) the shape of many animals is based (as any zoological schoolboy knows) on a repetition of similar segments (metamerism); (3) there are many odd resemblances between animal and vegetable shapes; and (4) as the brain increases with the evolution of higher forms of animals, so the decoration of the head, or alternatively of the caudal end of the body, increases, especially after the descent of the testes to an extra-abdominal position.

The author's main contention seems to be that decoration of the body increases with the evolving importance of eyesight and is then intended to enable members of a species to recognise one another visually. "In all these cases," he says, "we are presented with optical structures, organs to be looked at, the total appearance of which has a meaning only when it is appreciated as being directed towards a beholding eye." Later he speaks of "morphological elements which are correlated with a beholding eye in the same way as transmitters are with a receiving set which is tuned in to them."

Other colours and patterns help their owners as warning colours and as camouflage, and in molluscs and radiolarians (which cannot see one another) colours and patterns can be produced "without any relation to visibility." But Professor Portmann does not attempt to explain this, although he seems to recognise that some colours and patterns arise without any utilitarian import. This takes us back half a century to Hans Gadow, who pointed out that neither natural selection nor sexual selection could produce colours and patterns but could only determine which colours and patterns already produced would survive. Indeed Professor Portmann makes a similar statement. Mysticism, however, creeps in when he declares that those colours and patterns which have a visual use constitute a special organ whose function is to produce a visible effect.

DATE OF BIRTH

A FILM with this title has been made by the National Film Board of Canada and is being sponsored in this country by the Ministry of Labour and National Service. The film tells of the economic and social problems associated with the provision of employment for older men and women. It runs for 18 minutes, and copies may be hired from the Central Film Library, Government Building, Bromyard Avenue, Acton, London, W.3, or from the affiliated libraries in Scotland and Wales.

University of Oxford

At a convocation to be held on July 1 in connection with the Rhodes centenary it is proposed to confer the honorary degree of D.C.L. on Dr. W. G. Penfield, O.M., F.R.S., director of Montreal Neurological Institute and professor of neurosurgery in McGill University.

Royal College of Physicians of London

The following, having satisfied the censors' board, were elected to the membership on Jan. 29:

E. M. McLachlan, M.B. N.Z., R. J. Marshall, M.D. Belf., J. Q. Matthias, M.B. Lond., G. W. Scott, M.D. Lond., H. M. Sinclair, D.M. Oxfd, W. H. J. Summerskill, B.M. Oxfd, J. L. G. Thomson, M.B. Lond., Joan M. Wagner, M.B. Witwatersrand, M. H. Watson, M.B. N.Z., J. L. Whitby, M.B. Camb., J. C. Woodrow, M.B. Leeds.

These names should have been included in the list published last week.

Royal College of Physicians of Edinburgh

At a meeting of the college held on Feb. 3, with Dr. W. A. Alexander, the president, in the chair, the following were elected to the membership:

D. G. McIntosh, D. G. C. Whyte, M. P. Goel, L. S. C. Mendis, G. M. Baird, B. Bevan, D. P. Gupta, J. B. Gibson, A. D. Muldoon, F. C. Friedlander, L. Rabinowitz, S. A. Syed, W. Frain-Bell, J. Paul, C. Marks, C. H. Sivaraman, E. M. McLachlan, J. M. Neilson, R. H. Gosling, A. R. Somner, S. J. Cohen, D. H. H. Pullon, M. Dan, Z. H. El Massry, S. Sing, J. A. Chunn, J. L. Potter, S. J. Irani, P. Sobti.

1. Animal Forms and Patterns: A Study of the Appearance of Animals. By ADOLF PORTMANN. Translated by HELLA CZECH. London: Faber & Faber. 1952. Pp. 246. 25*s*.

Royal College of Surgeons of England

Prof. Reynaldo dos Santos (Lisbon) has been elected to the honorary fellowship.

Royal Faculty of Physicians and Surgeons of Glasgow

At a meeting of the faculty on Feb. 2, with Dr. Andrew Allison, the president, in the chair, A. H. Edwards was admitted a fellow (qua surgeon).

C.M.F./M.E.F. Physicians' Reunion Dinner

This dinner will be held on Saturday, March 28, at Simpson's-in-the-Strand, with Dr. D. Evan Bedford in the chair. Further information can be had from the hon. secretary, Dr. A. Willcox, 59, Harley Street, London, W.1.

Colyer Prize

An award of this prize will be made this year. It is offered for the best original work in dental science by a dental surgeon educated at a dental school in Great Britain or Northern Ireland who has not been qualified more than five years. Applications should be sent to the prize committee of the Royal Society of Medicine, 1, Wimpole Street, London, W.1, not later than Sept. 21.

The Horder Club

This club was formed about six years ago to honour Lord Horder and his work on the rheumatic diseases. It is comprised of a group representing many of the facets of the study of the rheumatic diseases and includes general physicians and, physicians interested in rheumatology and physical medicine, together with orthopædists and radiologists. It is hoped soon to add one or more men primarily interested in the basic sciences. The club met on Jan. 29 and discussed a film shown by Dr. Campbell Golding, illustrating some features in the radiographic study of rheumatoid arthritis. The hon. secretary is Dr. Ernest Fletcher, 41, Harley Street, London, W.1.

St. Bartholomew's Hospital, London

On Feb. 5 the Court of Common Council approved a proposal to build an extension to Barts which will contain 120 beds.

Biological Reagents for Skin Testing

Coccidiodin, histoplasmin, and blastomycosis antigen for diagnostic skin tests may now be obtained from the department of pathology, St. John's Hospital for Diseases of the Skin, Lisle Street, London, W.C.2 (tel. Gerrard 8383, ext. 22), and not from the London School of Hygiene and Tropical Medicine as previously.

Society for General Microbiology

The first Marjory Stephenson memorial lecture will be given to this society by Mr. D. D. Woods, F.R.S., at the Royal Institution, Albemarle Street, London, W.1, at 6 P.M. on Monday, April 13. He is to speak on the Integration of Research on the Nutrition and Metabolism of Micro-organisms.

CORRIGENDUM: *Function of the Hospital Outpatient Department.*—At the joint discussion on this subject held by the sections of medicine and general practice of the Royal Society of Medicine (*Lancet*, Feb. 7, 1953, p. 275) the chair was taken by Sir Alun Rowlands, president of the section of medicine. Dr. E. P. Scott, president of the section of general practice, attended the meeting but was not in the chair.

EMERGENCY BED SERVICE.—In the week ended last Monday applications for general acute cases numbered 1992. The proportion admitted was 79·58%. A yellow warning, withdrawn on Feb. 4, was reimposed last Tuesday.

The verbatim transactions of the third Commonwealth Health and Tuberculosis Conference, which was held in London last July, have now been published. Copies (21s.) may be had from the N.A.P.T., Tavistock House North, London, W.C.1.

Diary of the Week

FEB. 15 TO 21

Tuesday, 17th

BRITISH POSTGRADUATE MEDICAL FEDERATION
5.30 P.M. (London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1.) Dr. J. C. White: Human Hæmoglobins and Derived Pigments.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
8 P.M. *Section of Pathology.* Dr. A. Neuberger, F.R.S., Prof. C. Rimington, Dr. W. M. Davidson, Prof. C. H. Gray, Dr. J. C. Houston: Hæmoglobin Metabolism.

INSTITUTE OF DERMATOLOGY, St. John's Hospital, Lisle Street, W.C.2
5.30 P.M. Dr. W. J. O'Donovan: Hysteria Cutis.

WEST END HOSPITAL FOR NERVOUS DISEASES, 40, Marylebone Lane, W.1
5.30 P.M. Dr. D. Gordon: Neuroradiological demonstration.

MIDDLESEX COUNTY MEDICAL SOCIETY
3 P.M. (North Middlesex Hospital, Silver Street, Edmonton, N.18.) Cases.
4.45 P.M. Dr. E. C. O. Jewesbury: Narcolepsy.

SOCIETY FOR THE STUDY OF ADDICTION
5 P.M. (Westminster Hospital Medical School, Horseferry Road, S.W.1.) Prof. E. M. Jellinek, SC.D. (W.H.O.): International Aspects of Alcoholism.

Wednesday, 18th

UNIVERSITY OF LONDON
5.30 P.M. (London School of Hygiene and Tropical Medicine.) Sir Henry Dale, O.M.: Future of Pharmacy and Pharmacology.

ROYAL SOCIETY OF MEDICINE
5 P.M. *Section of Comparative Medicine.* Dr. E. G. C. Clarke, PH.D., Mr. John Hickman, M.R.C.V.S., Dr. D. H. Collins, Dr. J. T. Scales: Metals and Synthetic Materials in Relation to Tissues.
8.15 P.M. *Section of General Practice.* Dr. L. V. Gimson: Hypertension.

INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. J. A. Dudgeon: Virus Diseases.

INSTITUTE OF UROLOGY, St. Paul's Hospital, Endell Street, W.C.2
5 P.M. Mr. D. I. Williams: Spina Bifida and Incontinence.

EUGENICS SOCIETY
5 P.M. (26, Portland Place, W.1.) Prof. T. H. Marshall, M.A.: Social Selection in the Welfare State. (Galton lecture.)

HARVEIAN SOCIETY OF LONDON
5.30 P.M. (St. Mary's Hospital, Paddington, W.2.) Clinical meeting.

UNIVERSITY OF OXFORD
5 P.M. (Radcliffe Infirmary.) Prof. Dugald Baird: Epidemiological Aspects of Obstetrics. (Litchfield lecture.)

Thursday, 19th

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2
5 P.M. Mr. J. E. Richardson: Early Renal Symptoms of Parathyroid Tumour.

UNIVERSITY COLLEGE, Gower Street, W.C.1
4.45 P.M. Prof. V. B. Wigglesworth, F.R.S.: Chemical Aspects of Insect Physiology.

BRITISH POSTGRADUATE MEDICAL FEDERATION
5.30 P.M. (London School of Hygiene and Tropical Medicine.) Sir Alan Drury, F.R.S.: Uses and Applications of Human Blood-plasma Fractions.

INSTITUTE OF CHILD HEALTH, The Hospital for Sick Children, Great Ormond Street, W.C.1
5 P.M. Dr. D. V. Hubble: The Thin Child.

ST. GEORGE'S HOSPITAL MEDICAL SCHOOL, Hyde Park Corner, S.W.1
5 P.M. Dr. J. Hamilton Paterson: Neurological demonstration.

BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck Street, W.1
8 P.M. Prof. Robert McWhirter: Radiotherapeutic Technique in Breast Carcinoma.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE, Manson House, 26, Portland Place, W.1
7.30 P.M. Dr. M. A. C. Dowling: Malaria Eradication Experiment in Mauritius.

LONDON JEWISH HOSPITAL MEDICAL SOCIETY
8.30 P.M. (11, Chandos Street, W.1.) Mr. Sol. M. Cohen: Place of Sympathectomy Procedures.

LIVERPOOL MEDICAL INSTITUTION, 114, Mount Pleasant, Liverpool, 3
8 P.M. Dr. J. Berkson: Oxygen, the Premature Baby and Retrolental Fibroplasia. Mr. A. Sutcliffe Kerr: Unilateral Proptosis.

UNIVERSITY OF ST. ANDREWS
5 P.M. (Medical School, Small's Wynd, Dundee.) Prof. J. Crighton Bramwell: The Normal Heart.

Friday, 20th

UNIVERSITY COLLEGE
5.30 P.M. Dr. T. S. Work: Biosynthesis of Proteins. (Second of two lectures.)

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE
5.30 P.M. Dr. D. P. Cuthbertson: Problems of Quality and Quantity of Protein.

ROYAL SOCIETY OF MEDICINE
4.30 P.M. *Section of Epidemiology and Preventive Medicine.* Dr. Joan Taylor, Mr. Reginald Lovell, D.SC., Dr. A. M. McCall: Epidemiology of Salmonella Infections in Man and Animals with Special Reference to *Salmonella dublin.*
8.15 P.M. *Section of Radiology.* Dr. I. Churchill-Davidson: Technique of Simulated Rotation Therapy for Treatment of Carcinoma of the Bronchus. Dr. Mary Douglas: Uniformity of Dosage in Carcinoma of the Bladder. Dr. Charles L. Lewis: Treatment of the Meningeal System using Radioactive Isotope and Wedge Filters. Dr. J. Walter: Radioactive Gold in Malignant Effusions.

FACULTY OF RADIOLOGISTS
4 P.M. (Royal College of Surgeons.) Prof. B. W. Windeyer: A Radiotherapist's Impressions of a Visit to Canada.

INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. R. T. Brain: Common Skin Diseases in Children.

NORTH-WESTERN TUBERCULOSIS SOCIETY
5 P.M. (Liverpool Medical Institution.) Dr. G. S. Erwin and a gynæcologist: Tuberculosis and Pregnancy.

Saturday, 21st

BIOCHEMICAL SOCIETY
11 A.M. (London School of Hygiene and Tropical Medicine.) Biological Transformations of Starch and Cellulose.

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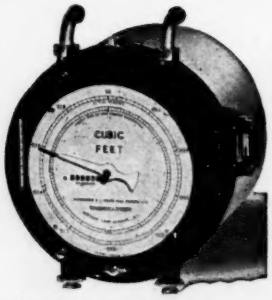

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Academic and Educational

EXAMINING BOARD IN ENGLAND
by the
ROYAL COLLEGE OF PHYSICIANS OF LONDON
and the
ROYAL COLLEGE OF SURGEONS OF ENGLAND

Notice is hereby given that the following Examinations will commence on the dates stated below :—

DIPLOMA IN CHILD HEALTH
Thursday, 19th March
DIPLOMA IN MEDICAL RADIOTHERAPY
Thursday, 16th April
DIPLOMA IN MEDICAL RADIO-DIAGNOSIS
Part II—Friday, 24th April
DIPLOMA IN ANÆSTHETICS
Thursday, 30th April

Applications and fees for either or both Parts of an Examination must reach the Secretary, Examination Hall, Queen-square, London, W.C.1, at least 21 days before Part I of the Examination begins. FRANCIS M. STENT, Secretary.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

SURGERY LECTURES AND CLINICAL CONFERENCES
APRIL, 1953

A Course of 24 Surgery Lectures, with 10 Clinical Conferences at certain selected hospitals, will be held from 13th to 30th April, 1953. Only a limited number of students can be accepted for the Clinical Conferences.

Fee : Whole Course £15 15s. ; Lectures only £10 10s.

Applications, accompanied by a cheque for the appropriate fee, should be sent to Mr. W. F. DAVIS, Deputy Secretary, Royal College of Surgeons of England, Lincoln's Inn-fields, W.C.2, from whom further information may be obtained. (HOLborn 3474.)

FACULTY OF ANÆSTHETISTS
ROYAL COLLEGE OF SURGEONS OF ENGLAND

LECTURES IN ANÆSTHETICS, 16TH MARCH–27TH MARCH

A Course of 40 Lectures in Anæsthetics will be held at the College from 16th March until 27th March. There will be 4 sessions daily (at 9.45 A.M., 11.15 A.M., 2.30 P.M., and 4 P.M.) from MONDAY to FRIDAY each week. Fee : £15 15s.

A series of Tutorials in Anæsthetics will be held during the same period as the lectures, consisting of 10 one-hourly sessions, commencing at 5.30 P.M. These are only available to those attending the Lectures. Fee : £10 10s.

Applications, accompanied by a cheque for the appropriate fee, should be sent to Mr. W. F. DAVIS, Secretary, Faculty of Anæsthetists, Royal College of Surgeons of England, Lincoln's Inn-fields, London, W.C.2, from whom full information concerning the above may be obtained. (HOLborn 3474.)

FACULTY OF ANÆSTHETISTS
ROYAL COLLEGE OF SURGEONS OF ENGLAND

LECTURES IN PHARMACOLOGY, MARCH, 1953

A Course of 20 Lectures in Pharmacology will be held at the College from 2ND to 6TH MARCH, inclusive.

The Lectures will be held on each day at 10 A.M.; 11.30 A.M.; 2 P.M.; and 3.30 P.M., and will be given by Prof. C. A. KEELE, Dr. H. C. STEWART, and Dr. A. H. GALLEY.

The fee for the Course will be 6 guineas or 10s. per single lecture.

Application should be made to the Secretary of the Faculty, accompanied by the appropriate fee.

W. F. DAVIS, Secretary.

UNIVERSITY OF LONDON

A LECTURE on "Problems of Quality and Quantity of Protein" will be given by Dr. D. P. CUTHBERTSON (Rowett Research Institute) at 5.30 P.M. on 20TH FEBRUARY at the London School of Hygiene and Tropical Medicine, Keppel-street, Gower-street, W.C.1.

Admission free, without ticket.

JAMES HENDERSON, Academic Registrar.

UNIVERSITY OF ABERDEEN

FORTNIGHT'S GENERAL INTENSIVE REFRESHER COURSE

A Fortnight's Intensive Course, intended mainly for General Practitioners, will be held from 4TH to 16TH MAY, 1953, in the University Medical Buildings, Foresterhill, and the associated hospitals in Aberdeen.

The fee for the Course will be 10 guineas. Schemes for financial assistance are in existence whereby the fee for the Course and the expenses of travelling and of the provision of a locum may, subject to certain conditions, be repaid to doctors engaged in practice under the National Health Service.

Numbers attending the Course will be limited, and application should be made by 11th April to the Chairman, Post-graduate Medical Committee, Department of Child Health, University Buildings, Foresterhill, Aberdeen, from whom further information may now be obtained.

INSTITUTE OF BASIC MEDICAL SCIENCES

LECTURES IN ANATOMY, APPLIED PHYSIOLOGY AND PATHOLOGY
APRIL–JULY, 1953

A Course of Lectures in the above subjects will be held at the Institute from 7th April to 3rd July, 1953. The Lectures will be held in the mornings from MONDAY to FRIDAY each week.

Fee : £36 15s.

Applications, accompanied by a cheque for the appropriate fee, should be sent to Mr. W. F. DAVIS, Secretary, Institute of Basic Medical Sciences, Royal College of Surgeons of England, Lincoln's Inn-fields, London, W.C.2, from whom full information concerning the above course may be obtained. (HOLborn 3474.)

EDINBURGH POST-GRADUATE BOARD FOR MEDICINE

GENERAL SURGERY

3-months courses of Postgraduate Surgery are arranged to start on 23RD MARCH and 28TH SEPTEMBER, 1953. These are suitable for surgeons requiring refresher courses in the current outlook on general surgery, or for graduates preparing to specialise in surgery ; approximately 275 hours of instruction are provided. Fee £31 10s.

MEDICAL SCIENCES

A 3-months course in Applied Anatomy, Physiology, Pathology, Bacteriology and Biochemistry will begin on 29TH JUNE, 1953. This course is suitable for postgraduates wishing to take the Primary Fellowship Examination, as a final preparation in these subjects. Considerable basic knowledge is highly desirable prior to taking this course. Fee £31 10s.

INTERNAL MEDICINE

Courses lasting 12 weeks, suitable for graduates wishing a refresher course, or to specialise in Medicine, begin on 30TH MARCH and 28TH SEPTEMBER, 1953. These courses consist of 320 hours instruction, comprising lectures, clinical demonstrations and ward visits. Fee £31 10s.

Additional instruction in Clinical Pædiatrics is arranged in conjunction with the course in Medicine, for which there is a small fee ; the numbers are limited.

Applications for enrolment should be addressed to the Director of Postgraduate Studies, Surgeons' Hall, Edinburgh, 8, supplying particulars of qualifications and postgraduate experience.

TANCRED'S STUDENTSHIPS

DIVINITY : MEDICINE : LAW
£100 p.a. each. For Men only.

About Whitsuntide next the Governors propose to elect 1 Student in Law at Lincoln's Inn.

Candidates must have been born in England, Scotland or Wales and be members of the Church of England and unmarried. Candidates must be within the ages of 20 years and 23 years and must have passed an approved examination of School Certificate or General Certificate of Education standard. The last day for sending in Petitions is 10th March, 1953.

A Divinity Studentship will be awarded on the result of an Examination conducted in December, 1953, by the Queen's, Christ's, St. John's, Emmanuel and Sidney Sussex Group of Colleges in the University of Cambridge.

A Physic Studentship will be awarded on the result of the Scholarship Examination conducted in January, 1954, by Gonville and Caius College in the University of Cambridge.

Further announcements relating to the Divinity and Physic Studentships will appear in this paper in April and September.

Apply for further particulars and form of Petition stating kind of Studentship and mentioning this paper to the Clerk, R.M.C. HOWARD, Esq., D.S.O., 28, Lincoln's Inn-fields, London, W.C.2.

NATIONAL ASSOCIATION FOR THE PREVENTION OF TUBERCULOSIS

CANADIAN SCHOLARSHIP

The NAPT offers a Scholarship, valued at £350 to enable a Chest Physician working in the United Kingdom to spend 3 months at sanatoria and clinics in Canada.

Applications should be sent to the Secretary-General, NAPT, Tavistock House North, Tavistock-square, London, W.C.1 by 31st March, 1953.

BEIT MEMORIAL FELLOWSHIPS FOR MEDICAL RESEARCH

Notice is hereby given that an Election of Junior Fellows to begin work on 1ST OCTOBER next will take place in June, 1953. Junior Fellowships are of the annual value of £600 for 3 years with, in certain circumstances, superannuation benefits to which the successful candidates will be required to contribute 5% of the annual stipend and to which the Trust will make a contribution of 10%. Candidates must have taken a degree in a faculty of a university approved by the Trustees in Her Majesty's Dominions, Protectorates and Mandated Territories, India, Pakistan, and the Republic of Ireland, or a medical diploma registrable in the United Kingdom. Elections to Junior Fellowships are rarely made above the age of 35 years.

Applications from candidates must be received not later than 14th April. Candidates must submit evidence that they can be given accommodation in the departments where they propose to work, which must be either in Great Britain or Ireland. Forms of application and all information may be obtained by letter only, addressed to the Secretary, Beit Memorial Fellowships for Medical Research, The Lister Institute, Chelsea Bridge-road, London, S.W.1. For overseas candidates forms of application may be obtained from the Secretary, South African Medical Council, P.O. Box 205, Pretoria, South Africa ; The Director, Commonwealth Office of Education, Box 3879, Sydney, Australia ; The Department of Health, Wellington, New Zealand and the Canadian Medical Association, 184, College-street, Toronto Canada.

GRESHAM COLLEGE, Basinghall-street, London, E.C.2

4 LECTURES will be given by Prof. H. HARTRIDGE, M.A., M.D., SC.D., M.R.C.P., F.R.S. (Gresham Professor in Physic) on "The Physiology of Vision—Part I" on MONDAY to THURSDAY, 16TH–19TH FEBRUARY.

The Lectures are free and begin at 5.30 P.M.

L.M.S.S.A.

FINAL EXAMINATION : SURGERY, 9th March, 13th April, 11th May, 1953. MEDICINE, PATHOLOGY, 16th March, 20th April, 18th May, 1953. MIDWIFERY, 17th March, 21st April, 19th May, 1953. MASTERY OF MIDWIFERY, May and November. DIPLOMA IN INDUSTRIAL HEALTH, July and December.

For regulations apply REGISTRAR, Apothecaries' Hall, Black Friars-lane, London, E.C.4.

UNIVERSITY COLLEGE LONDON

FREE PUBLIC LECTURES, SPRING TERM, 1953

THURSDAY, 19TH, 26TH FEBRUARY, 5TH, 12TH MARCH, at 4.45 P.M., Prof. V. B. WIGGLESWORTH, "Chemical Aspects of Insect Physiology."

MONDAY, 23RD FEBRUARY, at 4.45 P.M., Prof. JEAN ROCHE, "Comparative Biochemistry of Iodoproteins."

Complete list of public lectures from Publications Officer, University College London, Gower-street, W.C.1. (Stamped envelope required.)

INSTITUTE OF UROLOGY

in association with

ST. PETER'S, ST. PAUL'S, AND ST. PHILIP'S HOSPITALS

WEEK-END COURSE ON "THE ESSENTIALS OF UROLOGY"
6TH–8TH MARCH, 1953

Friday, 6th March, St. Peter's Hospital

Time	*Title*	*Lecturer*
2 P.M.	Operating Session, Prosta-tectomy and Cysto-scopy	Mr. HARLAND REES

Friday, 6th March, St. Paul's Hospital

8–9 P.M.	Lecture : Hæmaturia	Mr. J. D. FERGUSSON

Saturday, 7th March, Hillingdon Hospital

10 A.M.–12 NOON	Demonstration on "Clini-cal Cases"	Mr. H. G. HANLEY

Lunch at Hillingdon Hospital

Saturday, 7th March, St. Paul's Hospital

2–3 P.M.	Lecture : Hydronephro-sis	Mr. D. M. WALLACE
3.30 P.M.–4.30 P.M.	Lecture : Calculous Disease	Dr. C. E. DUKES

Tea

Sunday, 8th March, St. Paul's Hospital

10 A.M.–11 A.M.	Lecture : Injuries of the Urinary Tract	Mr. D. I. WILLIAMS
11.30 A.M.–12.30 P.M.	Lecture : Urinary Infec-tions	Mr. F. R. KILPATRICK

Lunch at St. Philip's Hospital

Sunday, 8th March, St. Paul's Hospital

2–4 P.M.	Demonstration on "X-ray Diagnosis"	Dr. J. J. STEVENSON

Fee for the course 5 guineas. Lunch and tea will be provided. Applications to the Secretary, Institute of Urology, 10, Henrietta-street, Covent Garden, W.C.2.

INSTITUTE OF UROLOGY. In association with St. Peter's, St. Paul's, and St. Philip's Hospitals. Whole-time RESEARCH ASSISTANT. Applications from registered medical practitioners, holding higher surgical qualifications for research into genito-urinary tuberculosis. The work will be undertaken at Hillingdon Hospital, and the hospitals mentioned above. Appointment in the first instance for 1 year. Salary £775 p.a.

Applications to the Secretary, Institute of Urology, 10, Henrietta-street, Covent Garden, London, W.C.2. Applications to be received by 17th February.

THE UNIVERSITY OF MANCHESTER. Applications for the post of LECTURER IN MEDICAL STATISTICS are invited from medical or non-medical graduates. Salary within the range £700–£1600 p.a. (for medically qualified persons), or £500–£1100 p.a. (for non-medically qualified persons). Initial salary according to qualifications and experience. Membership of F.S.S.U. and Children's Allowance Scheme.

Applications should be sent not later than 12th March, 1953, to the Registrar, the University, Manchester, 13, from whom further particulars and forms of application may be obtained.

THE UNIVERSITY OF MANCHESTER. Applications are invited for the post of ASSISTANT LECTURER or DEMONSTRATOR IN CHEMICAL PATHOLOGY. Candidates should hold a good Honours degree in Chemistry or Biochemistry. Salary not less than £450 p.a. with membership of F.S.S.U. and Children's Allowance Scheme.

Applications should be sent, not later than 28th February, 1953, to the Registrar, The University, Manchester, 13, from whom further particulars and forms of application may be obtained.

UNIVERSITY OF BRISTOL. Applications are invited for the post of LECTURER (Grade II) IN ANATOMY. Salary in the range of £900–£100–£1200 p.a. Applicants should be medically qualified and should have good academic qualifications and experience.

Applications, together with the names of not more than 2 referees, and copies of not more than 3 recent testimonials, should reach the undersigned, from whom further particulars may be obtained, not later than 16th February, 1953.

H. C. BUTTERFIELD, Registrar and Secretary.

UNIVERSITY OF BRISTOL. Applications are invited from medically qualified Women candidates for the post of DEMONSTRATOR IN ANATOMY. Salary £600–£50–£800 p.a.

Applications, giving full names, age, qualifications, details of education and experience, together with the names of not more than 2 referees, and copies of not more than 3 recent testimonials, should reach the undersigned, from whom further particulars may be obtained, not later than 16th February, 1953.

H. C. BUTTERFIELD, Registrar and Secretary.

UNIVERSITY OF GLASGOW. Applications are invited for a LECTURESHIP IN PSYCHOLOGICAL MEDICINE. The successful applicant will act as Assistant to the Professor of Psychological Medicine and will have clinical duties. Salary according to placement on University scale for clinical teachers. The final maximum is £1500 p.a.

Applications (16 copies), should be lodged, not later than 14th March, 1953, with the undersigned from whom further particulars may be obtained.

ROBT. T. HUTCHESON, Secretary of University Court.

UNIVERSITY COLLEGE OF THE WEST INDIES. Applications are invited for the post of LECTURER IN MEDICINE. The duties will include clinical work in the University College Hospital and instruction to students working for the medical degrees of the University of London. Salary scale is £800–£50–£1000–£50–£1200 p.a. Point of entry in the scale according to qualifications and experience. Child allowance and temporary cost-of-living allowance is paid. Superannuation is under the F.S.S.U. arrangements. Unfurnished accommodation is available at a rental of 5% of basic salary. The successful applicant will be expected to take up the post as soon as possible after April, 1953.

Applications (12 copies), giving full particulars of qualifications, and the names of 3 referees, should be received before 28th February, 1953, by the Secretary, Senate Committee on Higher Education in the Colonies, University of London, Senate House, W.C.1, from whom further particulars may be obtained.

UNIVERSITY OF MALAYA, Singapore. The World HEALTH ORGANIZATION requires a LECTURER IN INDUSTRIAL HYGIENE to be employed at the University of Malaya, Singapore. Salary U.S. $600 a month, free of income-tax, plus subsistence and free quarters, for 1–2 year contract. Free return passage.

Write, giving age, full particulars of experience, and qualifications, and the names of 2 referees, to the Secretary, Ministry of Health, Division 5A, Savile-row, London, W.1.

Hospital Services : Senior Appointments

NATIONAL HOSPITALS FOR NERVOUS DISEASES. The Board of Governors invites applications for the appointment of PHYSICIAN to the Department of Psychological Medicine (Consultant status) at The Maida Vale Hospital for Nervous Diseases, Maida Vale, W.9. Applicants must be Fellows or Members of the Royal College of Physicians of London and possess a qualification in psychological medicine. The appointment will be part-time and the successful applicant will be required to attend up to 4 half-days per week.

Applications (35 copies), giving the names of 3 referees, must be sent to the undersigned not later than 28th February, 1953.

H. EWART MITCHELL, Secretary,
The National Hospitals for Nervous Diseases.
Queen-square, W.C.1.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. CONSULTANT SURGEON (maximum part-time) Ipswich Group of Hospitals. Main hospitals : East Suffolk and Ipswich Hospital (360 Beds) ; Ipswich Borough General Hospital (300 Beds). Main hospitals only are stated but duties may include work at other hospitals.

Applications (8 copies), stating age, qualifications, and details of present and previous appointments, together with the names of 3 referees, to Secretary of Board, 117, Chesterton-road, Cambridge, by 23rd February, 1953. Candidates invited to visit the hospitals by direct arrangement with the Hospital Management Committee Secretary, East Suffolk and Ipswich Hospital.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. CONSULTANT RADIOLOGIST (for equivalent of 6 notional half-days weekly) in the West Suffolk Area. Main hospitals at Bury St. Edmunds (460 Beds) and Sudbury (215 Beds).

Applications (8 copies), stating age, qualifications, and details of present and previous appointments, together with the names of 3 referees, to Secretary of Board, 117, Chesterton-road, Cambridge, by 23rd February, 1953. Candidates invited to visit the hospitals by direct arrangement with the Hospital Management Committee Secretary, West Suffolk General Hospital, Bury St. Edmunds.

EAST ANGLIAN REGIONAL HOSPITAL BOARD AND BOARD OF GOVERNORS, UNITED CAMBRIDGE HOSPITALS. CONSULTANT PSYCHIATRIST (whole-time). The appointment carries the Medical Superintendentship of Fulbourn Mental Hospital (900 Beds and 4 miles from Cambridge) and includes sessional work in the Psychiatric Department of United Cambridge Hospitals at Addenbrookes Hospital.

Applications (12 copies), stating age, qualifications, and details of present and previous appointments, together with the names of 3 referees to Secretary of Board, 117, Chesterton-road, Cambridge, by 23rd February, 1953. Candidates invited to visit the hospitals by direct arrangement with the Medical Superintendent of Fulbourn Hospital, Cambridge.

ISLE OF THANET HOSPITAL MANAGEMENT COMMITTEE. Locum CHEST PHYSICIAN required in above group from 2nd to 21st March. Salary in accordance with the terms and conditions of service of hospital medical and dental staffs.

Applications, stating age, qualifications and experience, together with the names of 3 referees, as soon as possible to the Secretary, "St. Benet's," The Paragon, Ramsgate.

LIVERPOOL REGIONAL HOSPITAL BOARD. Winwick HOSPITAL. (2260 Beds.) Applications are invited for the post of MEDICAL SUPERINTENDENT (Consultant) to the above Hospital. The post is residential with a house available within the curtilage of the Hospital at a charge to be arranged. Applicants must possess the D.P.M. or an equivalent qualification in Psychiatry and have had at least 7 years approved psychiatric experience together with wide experience in the administration of a mental hospital. The possession of a higher qualification in general medicine will be considered an advantage. The person appointed will be required to undertake domiciliary consultations and the salary will be within the full Consultant scale.

Forms of application from, and to be returned to, Dr. T. Lloyd Hughes, Senior Administrative Medical Officer, Liverpool Regional Hospital Board, 19, James-street, Liverpool, 2, to be received not later than 7th March, 1953.

VINCENT COLLINGE, Secretary to the Board.

LIVERPOOL REGIONAL HOSPITAL BOARD. Applications are invited for the post of CONSULTANT RADIOLOGIST (part-time) on maximum sessions to Mill Road Maternity Hospital, Newsham General Hospital, and Bootle Hospital. Applicants must possess a Diploma in Radiology and have had wide experience in radiology.

Forms of application from, and to be returned to, Dr. T. Lloyd Hughes, Senior Administrative Medical Officer, Liverpool Regional Hospital Board, 19, James-street, Liverpool, 2, to be received not later than 7th March, 1953.

VINCENT COLLINGE, Secretary to the Board.

LEEDS REGIONAL HOSPITAL BOARD invites applications for the appointment of a Part-time CONSULTANT in Radiology (7 sessions per week) for duties at hospitals in the Harrogate and Ripon Hospital Management Committee Group.

Applications (10 copies), stating age, qualifications, and details of present and previous appointments with dates, together with the names of 3 referees, should be forwarded to the Secretary, Park-parade, Harrogate, not later than 28th February, 1953.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the whole-time non-resident post of ASSISTANT VENEREOLOGIST in the Bolton, Bury and Wigan hospital areas. Wide experience in prevention, diagnosis and treatment of venereal diseases essential. Successful applicant will work under the general guidance of a Consultant and will be required to live in or near Bolton. Salary £1300–£50–£1750.

Application forms can be obtained from the Senior Administrative Medical Officer to the Board at Cheetwood-road, Manchester, 8, and should be returned to be received not later than 23rd February, 1953.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the whole-time non-resident post of ASSISTANT RADIOLOGIST to the Bolton and District Hospital Centre (Bolton Royal Infirmary, Bolton District General Hospital, &c.). Applicants should possess the D.M.R.D. and have good experience in diagnostic radiology. The successful applicant will work under the general guidance of the Consultant Radiologist for this Area and will be required to live in or near Bolton. Salary £1300 (at age 32)—£50–£1750.

Forms of application can be obtained from the Senior Administrative Medical Officer to the Board at Cheetwood-road, Manchester, 8, and should be returned to be received not later than 23rd February, 1953.

NEWCASTLE REGIONAL HOSPITAL BOARD. SUNDERLAND AREA HOSPITAL MANAGEMENT COMMITTEE. Locum Tenens RADIOLOGIST required for period latter part of February and March, 1953. Consultant appointment. Salary 45 guineas per week.

Applications, together with names and addresses of referees (preferably), or testimonials to a total of 3, to be sent to the Senior Administrative Medical Officer, "Blythswood South," Osborne-road, Newcastle upon Tyne, 2.

PLYMOUTH CLINICAL AREA. Whole-time Locum CHEST PHYSICIAN (Senior Hospital Medical Officer grade) required for the Plymouth Clinical Area immediately for a period of 2–3 months to be based at Mount Gold Chest Hospital.

Applications in writing, stating age, qualifications and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the South-Western Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Whole-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade) at Cane Hill Hospital, Coulsdon, Surrey, which has 4 outpatient clinics and undertakes postgraduate teaching in association with the Institute of Psychiatry. It is within easy reach of the London Teaching Centres and every facility is given to staff working for higher medical qualifications.

Applications (5 copies), giving date of birth, qualifications, experience, names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 28th February, 1953. Applicants may visit Hospital by local arrangement.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of a Whole-time ASSISTANT PSYCHIATRIST, to work under Consultant Psychiatrists at Knowle Hospital, Fareham, Hants. Salary scale £1300–£50–£1750 p.a. Candidates should possess the D.P.M. and have experience of both inpatient and outpatient work in psychiatry.

Applications (5 copies), stating date of birth, qualifications, experience, and present appointment(s), and giving the names and addresses of 3 referees, should be made by letter and sent to the Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, London, W.1, to arrive not later than 28th February, 1953. Applicants may visit the Hospital by local arrangement.

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD requires Whole-time ASSISTANT CHILD PSYCHIATRIST (Senior Hospital Medical Officer grade) to work under Consultant in the Hampshire Child Guidance Service. Successful candidate will be required to act as Psychiatrist at some of the Child Guidance Clinics under the Hampshire Education Committee centred at Winchester with branches at Aldershot, Gosport, Eastleigh, Lymington, Andover and Basingstoke. There is a team of 2 Educational Psychologists and social workers. Candidate appointed will be required also to examine and advise on children and young people referred for advice by Juvenile Courts or otherwise remitted to remand homes of which there are 3 in the Area.

Applications (5 copies), giving date of birth, qualifications, experience, names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 28th February, 1953. Applicants may visit Clinics by arrangement with County Medical Officer of Hampshire County Council.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited to fill a vacancy for a Whole-time ASSISTANT PATHOLOGIST to the Brighton and Lewes Group of hospitals. Candidates must have had general experience in pathology and possession of a higher qualification is desirable. Salary within the scale £1300–£50–£1750.

Apply, stating nationality, age, sex, qualifications and experience, including details of present appointment and of war service, together with the names and addresses of 3 referees, to the Secretary, Advisory Appointments Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1. The last day for acceptance of applications will be 28th February, 1953.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited to fill a vacancy for a Whole-time ASSISTANT CHEST PHYSICIAN at Preston Hall Hospital, British Legion Village, Maidstone, available on 1st May, 1953. Applicants must have had previous experience in chest diseases, and a higher qualification in medicine, a Diploma of Membership of a Royal College of Physicians or a Diploma in Public Health would be an advantage. Salary within the scale £1300–£50–£1750. Applicants may visit the Hospital.

Apply, stating nationality, age, sex, qualifications and experience, including details of present appointment and of war service, together with the names and addresses of 3 referees, to the Secretary, Advisory Appointments Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1. The last day for acceptance of applications will be 28th February, 1953.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the post of RADIOLOGIST at the Royal Infirmary of Edinburgh, on the salary scale of £1300–£50–£1750. The post is superannuable, and the conditions of service will be in accordance with the regulations.

Applications (8 copies), giving particulars of age, previous experience and qualifications, together with the names of 3 referees, should be submitted to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, within 30 days.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the post of PATHOLOGIST to the Fife District Laboratory, situated at Cameron Hospital, near Leven, Fife. The laboratory has been newly constructed, and will deal with the laboratory requirements from all hospitals, general practitioners and the Public Health Authorities within the County of Fife. Salary will be on the scale of £1300–£50–£1750 p.a.

Applications, together with the names of 3 referees, should be submitted to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, 3, within 30 days.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited from suitably qualified medical practitioners for the following appointments :—

Whole-time CONSULTANT RADIOLOGIST at the Western Infirmary, Glasgow, with duties also at Killearn Hospital.

Whole-time CONSULTANT SURGEON at Hairmyres Hospital, East Kilbride.

Whole-time CONSULTANT PSYCHIATRIST AND PHYSICIAN SUPERINTENDENT at Argyll and Bute Mental Hospital, Lochgilphead. A house is available.

Whole-time ASSISTANT E.N.T. SURGEON for duties in the Lanark County Area, with associate duties at Glasgow Royal Infirmary. Salary on the scale £1300–£50–£1750 p.a.

Whole-time CONSULTANT CHEST PHYSICIAN for the Tuberculosis Unit (228 Beds), Hairmyres Hospital, East Kilbride. The applicant appointed will act as Physician-Superintendent to Hairmyres Hospital and Medical Coördinator to the hospitals within the Group of the Board of Management for Coatbridge, Airdrie and District Hospitals, and he will be further required to associate himself with the Area Supervising Tuberculosis Physician of the County of Lanark Area, and to participate in the work of the tuberculosis clinics of that Area. A house is available.

The above appointments will be subject to the National Health Service (Scotland) superannuation regulations.

Applications (16 copies), stating date of birth, qualifications, experience, and present appointment, and giving the names of 3 referees, should be submitted not later than 30 days after the publication of this advertisement to the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2.

SHEFFIELD REGIONAL HOSPITAL BOARD. Applications are invited from registered medical practitioners preferably holding a higher qualification in psychiatry for the whole-time post of ASSISTANT PSYCHIATRIST at the Towers Hospital, Humberstone, Leicester. A 6-roomed flat is available. Salary scale £1300–£50–£1750 p.a.

Application forms and further details may be obtained from the Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Fulwood House, Old Fulwood-road, Sheffield, 10. Completed forms should be returned to the Secretary not later than 7th March, 1953.

SHEFFIELD REGIONAL HOSPITAL BOARD. Applications are invited from registered medical practitioners possessing a higher qualification in psychiatry for the whole-time post of CONSULTANT PSYCHIATRIST at Harmston Hall Hospital. This M.D. Institution has several ancillary premises and the successful candidate will be designated Medical Superintendent. He will also be the Medical Adviser in Mental Deficiency to the Local Health Authorities in Lincolnshire. A house is available.

Application forms and further details may be obtained from the Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Fulwood House, Old Fulwood-road, Sheffield, 10. Completed forms to be returned to the Secretary not later than 7th March, 1953.

SHEFFIELD REGIONAL HOSPITAL BOARD. Derby CHEST SERVICE. Required immediately, Locum SENIOR HOSPITAL MEDICAL OFFICER in Chest Diseases, for Clinics in Derby and the South Derbyshire Area, for a period of approximately 3 months. The post is a non-resident one and the possession of a car is essential. Remuneration will be at the rate of 31½ guineas per week.

Applications, giving the names and addresses of 2 referees, should be sent to the Secretary, Sheffield Regional Hospital Board, Fulwood House, Old Fulwood-road, Sheffield, 10.

SHEFFIELD REGIONAL HOSPITAL BOARD. Required Locum SURGEON to the Boston Group of Hospitals, for the period 23rd March to the 22nd April, 1953, inclusive. Accommodation is available if required. Remuneration will be at the rate of 31½ guineas or 45 guineas per week according to status.

Applications, giving the names and addresses of 2 referees, should be sent to the Secretary, Sheffield Regional Hospital Board, Fulwood House, Old Fulwood-road, Sheffield, 10.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. ROYAL INFIRMARY UNIT. Applications are invited for the whole-time post of SENIOR HOSPITAL MEDICAL OFFICER in Neuropathology at the above Hospital. A higher qualification and previous experience in this specialty essential.

Applications (15 copies), stating age, qualifications, and experience, with the names of 3 referees, should be sent to the Chief Administrative Officer (from whom further particulars may be obtained), The United Sheffield Hospitals, West-street, Sheffield, 1, not later than 28th February, 1953.

STAFFORD. ST. GEORGE'S HOSPITAL. (1108 Beds.) MID-STAFFS MENTAL GROUP OF HOSPITALS. Applications invited for appointment of Whole-time CONSULTANT PSYCHIATRIST AND DEPUTY MEDICAL SUPERINTENDENT, with duties also at Coton Hill Hospital, Stafford (130 Beds), and associated clinics. House provided. Possession of D.P.M. and wide experience in specialty essential.

Applications (15 copies), stating name, age, nationality, qualifications, present and previous appointments, and details of 3 referees, to Secretary, Birmingham Regional Hospital Board, 10, Augustus-road, Birmingham, 15, before 2nd March, 1953.

WELSH REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of a Whole-time CONSULTANT PSYCHIATRIST to be based at Hensel Castle Mental Deficiency Institution (566 Beds), and who will also be required to visit mental deficiency institutions in all parts of Wales. Candidates should have had a wide experience in mental deficiency and hold a Diploma in Psychological Medicine.

Applications (12 copies), stating date of birth, giving a summary of qualifications, experience, previous appointments with dates, and publications, together with the names of 3 referees, should be addressed to the Senior Administrative Medical Officer, Welsh Regional Hospital Board, Cathays Park, Cardiff, within 21 days of appearance of this advertisement

WELSH REGIONAL HOSPITAL BOARD. Applications. are invited for the appointment of a Whole-time ASSISTANT MEDICAL OFFICER in Thoracic Medicine (Senior Hospital Medical Officer scale) at the Glan Ely Hospital, Fairwater, Cardiff (240 Beds). Previous experience in tuberculosis and chest diseases is essential.

Applications (12 copies), stating date of birth, giving a summary of qualifications, experience, previous appointments with dates, and publications, together with the names of 3 referees, should be addressed to the Senior Administrative Medical Officer, Welsh Regional Hospital Board, Cathays Park, Cardiff, within 21 days of appearance of this advertisement.

NEW ZEALAND. WAIKATO HOSPITAL BOARD. SUPERINTENDENT-IN-CHIEF AND MEDICAL SUPERINTENDENT of the Waikato Hospital, Hamilton, New Zealand. Applications are invited from qualified medical practitioners of the British Empire for the above-mentioned dual position. Special importance will be attached to previous hospital administrative experience, and appointee will be given charge of a limited number of beds, if so desired. Salary in accordance with the Hospital Employment Regulations, 1952, with a salary scale of £1940–£2190 (N.Z.) determinable according to qualifications and experience. 2-storied modern residence provided at nominal annual rental of £110.

Conditions of appointment, accompanying explanatory memorandum, and form of application obtainable from the High Commissioner for New Zealand, 415, Strand, London, W.C.2. The name of this paper should be mentioned, and the following reference quoted, viz. : A.3/6/8. Applications close in New Zealand on 9th March, 1953, and must reach the High Commissioner's Office, London, not later than 25th February, 1953.

Hospital Services : Junior Appointments

ACTON HOSPITAL, Gunnersbury-lane, London, W.3. Part-time SENIOR HOUSE OFFICER (dermatology) required, for outpatients, for 1 half-day per week (Wednesday afternoon). Salary pro rata to £670 p.a.

Applications to Hospital Secretary by 20th February.

ALBERT DOCK ORTHOPÆDIC AND TRAUMATIC HOSPITAL, Alnwick-road, E.16. There will be a vacancy for a RESIDENT SENIOR CASUALTY AND RECEIVING-ROOM OFFICER on 1st March, salary £670.

Applications, stating age, qualifications and experience, with names of 3 recent referees, should be sent to the undersigned not later than Saturday, 21st February.

F. A. LYON, Secretary.

Dreadnought Hospital, Greenwich, S.E.10.

BATTERSEA GENERAL HOSPITAL, Battersea Park, S.W.11. CASUALTY OFFICER/HOUSE SURGEON (resident), House Officer grade.

Apply, enclosing copies of 2 recent testimonials, to Hospital Secretary.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. RESIDENT SENIOR HOUSE OFFICER required for Casualty Department. Successful candidate will work under supervision of orthopædic and traumatic Specialist. Preference given to applicant who has held resident surgical and medical posts in general hospitals. Post vacant immediately. Appointment for 6 months, subject to renewal for further 6 months.

Applications, with names of 2 referees or copies of 2 testimonials, to Medical Director by 28th February, 1953.

DREADNOUGHT SEAMEN'S HOSPITAL, Greenwich, S.E.10. (General Hospital of 142 Beds.) There will be a vacancy for a HOUSE PHYSICIAN (pre-registration) on 21st March.

Applications, stating age, qualifications, and experience, and giving the names of 3 recent referees, should reach the undersigned not later than 7th March. F. A. LYON, Secretary.

Dreadnought Seamen's Hospital, Greenwich, S.E.10.

EAST END MATERNITY HOSPITAL, 384 398, Commercial-road, London, E.1. (60 Beds.) Post recognised for M.R.C.O.G. RESIDENT OBSTETRICAL OFFICER required, 6 months House Officer (third) and, subject to satisfactory service, 6 months Senior House Officer. Whitley Council salaries ; deduction for emoluments £100 and £156 respectively. Post vacant 23rd March, 1953.

Applications to Secretary, Stepney Group Hospital Management Committee, Raine-street, E.1.

FRIERN HOSPITAL, New Southgate, N.11. (2470 Beds.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. PSYCHIATRIC REGISTRAR required at above Hospital. Candidates should have adequate general medical and psychiatric experience. Candidates may visit the Hospital by direct arrangement.

Application forms obtainable from, and returnable to, Secretary, Friern Hospital Management Committee, Friern Hospital, New Southgate, N.11, by 23rd February, 1953.

FULHAM HOSPITAL, W.6. South West Metropolitan REGIONAL HOSPITAL BOARD. FULHAM AND KENSINGTON HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment as REGISTRAR (anæsthetic) at above Hospital. Candidates may visit the Hospital by arrangement with the Physician-Superintendent.

Applications (5 copies are required to be completed) to be submitted by 27th February, 1953, on forms obtainable from the Group Secretary (L.95), Fulham and Kensington Hospital Management Committee, 5, Collingham-gardens, S.W.5 (send stamped addressed foolscap envelope).

GERMAN HOSPITAL, Dalston, London, E.8. Applications are invited for the post of HOUSE SURGEON (obstetrics and gynæcology) at the above Hospital, vacant during February, 1953, and should be sent to the Secretary, Hospital Management Committee, Hackney Hospital, E.9, by 18th February.

HACKNEY HOSPITAL, E.9. (811 Beds.) Applications are invited for the 6 months appointment of HOUSE PHYSICIAN, vacant 8th March, 1953, and should be sent with copies of 3 testimonials, to Secretary, Hackney Group Hospital Management Committee, Hackney Hospital, E.9, by 23rd February.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, London, W.12. 6 HOUSE PHYSICIANS (general medicine) required 1st May.

Applications, stating age, qualifications, experience, copies of 2 recent testimonials, to Secretary, Board of Governors, by 28th February.

HAMMERSMITH HOSPITAL AND INSTITUTE OF OBSTETRICS AND GYNÆCOLOGY, London, W.12. HOUSE OFFICER (obstetrics) required 1st May.

Applications, stating age, qualifications, experience, copies of 2 recent testimonials, to Secretary, Board of Governors, by 28th February.

HAMPSTEAD GENERAL HOSPITAL, The Green, N.W.3. (ROYAL FREE HOSPITAL GROUP.) Applications are invited for the resident post of HOUSE PHYSICIAN, vacant 1st April, 1953, tenable for a period of 6 months. Preference will be given to candidates seeking pre-registration posts under the Medical Act, 1950.

Application forms may be obtained from the Administrative Officer, to whom they should be returned together with copies of 3 recent testimonials, by 27th February, 1953.

HAMPSTEAD GENERAL HOSPITAL, The Green, N.W.3. (ROYAL FREE HOSPITAL GROUP.) Applications are invited for the resident post of HOUSE SURGEON, vacant 1st April, 1953, tenable for a period of 6 months. Preference will be given to candidates seeking pre-registration posts under the Medical Act, 1950.

Application forms may be obtained from the Administrative Officer, to whom they should be returned together with copies of 3 recent testimonials, by 27th February, 1953.

HOSPITAL OF ST. JOHN AND ST. ELIZABETH, 60, Grove End-road, N.W.8. Applications are invited from registered medical practitioners (Male) for the appointment of HOUSE SURGEON to the Midwifery and Gynæcology Departments and to be responsible for the Casualty Department, to become vacant on Monday, 30th March, 1953. Appointment will be for a period of 6 months. Salary is at the rate of £350 p.a.

Applications should reach the Secretary on or before Monday, 2nd March, 1953, together with copies of 3 recent testimonials.

HOSPITAL OF ST. JOHN AND ST. ELIZABETH, 60, Grove End-road, N.W.8. Applications are invited from registered medical practitioners (Male) for the appointment of HOUSE SURGEON, to become vacant during the first week of March, 1953. Appointment will be for a period of 6 months. Salary is at the rate of £350 p.a.

Applications should reach the Secretary on or before Friday, 27th February, 1953, together with copies of 3 recent testimonials.

HIGHLANDS HOSPITAL, Winchmore Hill, London, N.21. (General Hospital—818 Beds.) HOUSE SURGEON required, vacant 1st March. Preference will be given to applicants seeking pre-registration posts under Medical Act, 1950.

Applications, with copies of 3 testimonials, to Hospital Secretary.

LONDON CHEST HOSPITAL. Hospitals for Diseases of THE CHEST. Vacancies occur 1st April, 1953, for :—

RESIDENT HOUSE PHYSICIAN.

NON-RESIDENT HOUSE PHYSICIAN.

Appointments for 6 months, 4 in London, 2 at the Country Branch, near Letchworth, and posts are graded as House Officer. Duties include work in the Outpatient Department and Refill Clinic as well as in wards.

Applications, stating age, qualifications with dates, and previous appointments held, with copies of 3 testimonials, should reach the undersigned not later than 18th February, 1953.

THOMAS BROWN, House Governor.

London Chest Hospital, E.2.

LONDON CHEST HOSPITAL. Hospital for Diseases of THE CHEST. A vacancy occurs 1st April, 1953, for Part-time REGISTRAR (Registrar grade), E.N.T. Department, to attend up to 3 sessions a week. The appointment is for 1 year in the first instance.

Applications, stating date of birth, qualifications with dates, and previous appointments held, with copies of 3 testimonials, should reach the undersigned by 21st February, 1953.

THOMAS BROWN, House Governor.

London Chest Hospital, E.2.

LONDON HOSPITAL, Whitechapel, E.1. Applications invited for post of Part-time SENIOR REGISTRAR to the Ophthalmic Department. Candidates should be Fellows of the Royal College of Surgeons and possess considerable experience of ophthalmic work. Successful candidate required to attend at least 6 sessions per week. Appointment will be for 1 year in first instance.

Applications (12 copies), giving the names and addresses of 3 referees, should be addressed to the House Governor to arrive not later than 28th February, 1953.

H. BRIERLEY, House Governor.

NORTH MIDDLESEX HOSPITAL AND EDMONTON CHEST CLINIC. Applications are invited for the post of SENIOR HOUSE OFFICER (tuberculosis), resident ; to above Hospital and Clinic. Duties : medical and surgical, under the direction of Chest Physician and Thoracic Surgeon. Vacant 1st March, 1953. 6 months appointment with possible extension to 1 year. Further details on application.

Applications, stating age, qualifications, experience, nationality, together with copies of recent testimonials and/or names of 2 referees, to Secretary of Hospital, by 21st February.

NORTH MIDDLESEX HOSPITAL, Edmonton, N.18. Applications are invited for the post of HOUSE SURGEON (resident). General and genito-urinary surgery. 6 months appointment. Vacant 1st April, 1953.

Applications, stating age, qualifications, experience, nationality, with copies of recent testimonials, to Secretary of Hospital by 23rd February.

NORTH MIDDLESEX HOSPITAL, Edmonton, N.18. Applications are invited for the post of HOUSE SURGEON (resident). General surgery. 6 months appointment. Vacant 1st April, 1953.

Applications, stating age, qualifications, experience, nationality, with copies of recent testimonials, to Secretary of Hospital by 23rd February.

NORTH MIDDLESEX HOSPITAL, Edmonton, N.18. Applications are invited for the post of RECEIVING-ROOM OFFICER (Senior House Officer), non-resident. Duties : hospital admissions and casualties. Hours : 9.30 A.M.–5.30 P.M. Monday–Friday ; 9.30 A.M.–1 P.M. Saturday ; Sunday free. Candidates should have held House Officer posts. 6 months appointment with possible extension to 1 year. Vacant 1st April.

Applications, stating age, qualifications, experience, nationality, together with copies of recent testimonials and/or names of 2 referees, to Secretary of Hospital by 23rd February.

NORTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD. Whole-time REGISTRAR in Chest Diseases required at Willesden Chest Clinic, Pound-lane, N.W.10. Duties will include work on the District and supervision of 20 Beds in Neasden Hospital, and may also include some teaching at Central Middlesex Hospital. Good training in general medicine essential, and special experience in chest diseases desirable. Clinic may be visited by direct appointment.

Application forms obtainable from, and returnable to, Secretary, Central Middlesex Group Hospital Management Committee, Acton-lane, N.W.10, by 25th February.

PADDINGTON HOSPITAL, W.9. (572 Beds.) North West METROPOLITAN REGIONAL HOSPITAL BOARD. SURGICAL REGISTRAR required at above Hospital, whole-time, non-resident. Duties consist of ward, outpatients and teaching responsibilities. There is a linkage for teaching purposes with St. Mary's Hospital. Post vacant 1st April, 1953.

Application forms obtainable from, and returnable to, Secretary, Paddington Group Hospital Management Committee, Paddington Hospital, 285, Harrow-road, London, W.9, by 25th February, 1953.

PADDINGTON HOSPITAL, W.9. (572 Beds.) North West METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR in Obstetrics and Gynecology required at above Hospital, whole-time, resident. Department contains 101 obstetric and 38 gynæcological beds. Post approved for M.R.C.O.G. Candidates may visit Hospital by direct appointment. Post vacant 1st April, 1953.

Application forms obtainable from, and returnable to, Secretary, Paddington Group Hospital Management Committee, Paddington Hospital, 285, Harrow-road, London, W.9, by 25th February, 1953.

PADDINGTON GREEN CHILDREN'S HOSPITAL, W.2. (ST. MARY'S HOSPITAL.) Applications are invited for the post of CASUALTY OFFICER (second or third post). The appointment is non-resident, tenable for 6 months as from 1st April, 1953.

Applications, stating age, nationality, qualifications with dates, and experience, with copies of recent testimonials, should reach the Secretary not later than 3rd March, 1953.

PUTNEY HOSPITAL, Lower Common, S.W.15.

(1) CASUALTY OFFICER AND FRACTURE HOUSE SURGEON (non-resident), vacant from 29th March, 1953.

(2) CASUALTY OFFICER AND E.N.T. HOUSE SURGEON (non-resident), vacant from 4th April, 1953.

(3) HOUSE SURGEON (resident), vacant from 4th April, 1953, applications are invited from registered practitioners and pre-registration interns.

Apply, enclosing copies of 2 recent testimonials, to Hospital Secretary.

QUEEN MARY'S (Roehampton) HOSPITAL, London, S.W.15. (501 Beds.) MINISTRY OF PENSIONS. The post of SENIOR HOUSE OFFICER (medical) which provides practical experience in internal medicine is now vacant. Salary £670 p.a., with a deduction of £130 for residential emoluments.

An application form will be provided on request to the Director-General of Medical Services (M.S.2), Ministry of Pensions, Norcross, Blackpool, Lancs.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, London, E.15. Applications are invited for the appointment of SENIOR OBSTETRIC HOUSE SURGEON (Senior House Officer grade) for 6 months commencing as soon as possible. The post is recognised for the M.R.C.O.G.

Applications, stating age, and experience, together with copies of testimonials, should be sent to the undersigned by 20th February, 1953. M. J. HUNTLEY, Group Secretary,

West Ham Group Hospital Management Committee.

Stratford, London, E.15.

QUEEN ELIZABETH HOSPITAL FOR CHILDREN MANAGEMENT COMMITTEE, Hackney-road, London, E.2, Shadwell, E.1, and BANSTEAD WOOD, SURREY. HOUSE OFFICER. This appointment will be made for 2 consecutive periods of 6 months commencing 1st April, 1953. First appointment as House Physician and second as House Surgeon and Casualty Officer.

Application forms may be obtained from the Secretary at Hackney Road and should be returned with copies of not more than 3 testimonials, on or before 21st February, 1953.

ROYAL FREE HOSPITAL. Applications are invited for the post of REGISTRAR to the Anæsthetic Department at the above Hospital. Applicants must be registered medical practitioners of not more than 10 years qualification and should hold the Diploma in Anæsthetics or similar qualification. The appointment is full time, resident, for 1 year in the first instance, duties to commence on 1st April. Salary and conditions of service in accordance with those laid down by the Ministry of Health.

Application forms may be obtained from the Secretary to the Board of Governors, The Royal Free Hospital, Gray's Inn-road, London, W.C.1, to whom they should be returned not later than 1st March, 1953.

ROYAL FREE HOSPITAL. Applications are invited for the post of SENIOR REGISTRAR to the Anæsthetic Department at the above Hospital. Applicants must be registered medical practitioners of not more than 10 years qualification and should hold the Diploma in Anæsthetics or similar qualification. The appointment is full time, resident, for 1 year in the first instance, duties to commence on 1st April. Salary and conditions of service in accordance with those laid down by the Ministry of Health.

Application forms may be obtained from the Secretary to the Board of Governors, The Royal Free Hospital, Gray's Inn-road, London, W.C.1, to whom they should be returned not later than 1st March, 1953.

ROYAL NATIONAL THROAT, NOSE AND EAR HOS-PITAL, Gray's Inn-road, W.C.1, and Golden-square, W.1. RESIDENT HOUSE SURGEON. There will be a vacancy (second or subsequent post) on 1st March, 1953. Appointment for 6 months with salary as laid down for House Officer grade in the terms and conditions of service under the National Health Service.

Applications, stating age, qualifications, full details of previous experience (particularly in this specialty), with copies of 1–3 recent testimonials, should be sent to the House Governor immediately.

ROYAL NATIONAL THROAT, NOSE AND EAR HOS-PITAL, Gray's Inn-road, London, W.C.1, and Golden-square, W.1. There will be a vacancy in the grade of SENIOR HOUSE OFFICER as from 1st April, 1953, and applications are invited. The appointment is in accordance with the terms and conditions of service in the National Health Service, for an initial period of 6 months. Applicants should have good clinical experience in general surgery and in this specialty, and they should preferably hold a higher surgical qualification or have passed the Primary examination for the F.R.C.S.

Applications, giving full information as to qualifications and experience, with the names of 2 referees, should be sent to the House Governor before 28th February, 1953.

ST. MARY'S HOSPITAL, W.2. Applications are invited for the post of CLINICAL ASSISTANT (part-time) to the E.N.T. Department, St. Mary's Hospital. The appointment will be for a first period of 12 months, and the successful candidate will be required to commence duties as soon as possible. The appointment is for 2 notional half-days per week (Monday and Thursday mornings), and the post is graded Registrar.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, and details of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, within 10 days of the appearance of this advertisement.

ST. MARY'S HOSPITAL, W.2. Applications are invited for the post of OUTPATIENT PART-TIME SURGICAL ASSISTANT, graded "Senior House Officer," for 4 notional half-days per week—i.e., Monday P.M., Wednesday A.M., Thursday P.M., and Friday P.M. The appointment will be for a first period of 12 months, and the successful candidate will be required to commence duties as soon as possible.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, and details of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, within 10 days of the appearance of this advertisement.

ST. JAMES' HOSPITAL, Ouseley-road, Balham, S.W.12. SENIOR HOUSE OFFICER (resident) required for Anæsthetics Department.

Applications, stating age, qualifications, experience, and names of 2 referees, to Group Secretary, Wandsworth Hospital Group, 14, Atkins-road, Balham, S.W.12, by 25th February, 1953.

ST. JAMES' HOSPITAL, Ouseley-road, Balham, S.W.12. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of REGISTRAR in the Anæsthetics Department of the above Hospital.

Application forms (send stamped addressed foolscap envelope), obtainable from the Group Secretary, Wandsworth Hospital Group, 14, Atkins-road, Balham, S.W.12, to be completed and returned by 25th February, 1953.

ST. NICHOLAS HOSPITAL, Plumstead, London, S.E.18. SENIOR HOUSE SURGEON, vacant immediately. Orthopædic and E.N.T. Surgery. Appointment for 6 months in first instance and may be renewed for further period. Salary £670 p.a., less £150 p.a. for residence.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

ST. STEPHEN'S HOSPITAL, Fulham-road, Chelsea, S.W.10. HOUSE SURGEON (general surgery), resident. Pre- or post-registration. Immediate vacancy. This post is recognised under the F.R.C.S. regulations.

Applications, naming 2 referees, to the Medical Superintendent immediately.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. Applications are invited from registered Female medical practitioners for the appointment of RESIDENT MEDICAL OFFICER at the Hospital's 50-Bed country branch near Crawley, Sussex. The post is vacant 24th March, 1953, and is full-time. A part-time non-resident appointment could be made. The appointment is of Senior House Officer grade and is for 1 year.

For form of application apply to the Secretary at the Hospital.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be a vacancy on 18th May, 1953, for a RESIDENT DENTAL HOUSE SURGEON (Senior House Officer) salary £670 p.a. The post is recognised for the Fellowship in Dental Surgery, Royal College of Surgeons. Experience is given in both oral surgery and orthodontics.

Further particulars and form of application, which must be returned not later than 2nd March, 1953, may be obtained from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be a vacancy for a Whole-time ASSISTANT MEDICAL REGISTRAR (Registrar grade) on 16th April, 1953.

Further particulars and form of application, which must be returned not later than Monday, 2nd March, 1953, may be obtained from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be vacancies on 15th May, 1953, for the following Senior House Officers :—

HOUSE PHYSICIAN.

HOUSE SURGEON to the Orthopædic and Plastic Departments.

Further particulars and form of application, which must be returned not later than 2nd March, 1953, may be obtained from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

THE HOSPITAL FOR SICK CHILDREN, Great Ormond-street, London, W.C.1. There will be a vacancy on 15th May, 1953, for a MEDICAL REGISTRAR AND PATHOLOGIST (Senior Registrar).

Further particulars and form of application, which must be returned not later than Monday, 2nd March, 1953, may be obtained from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

WEST LONDON HOSPITAL, Hammersmith-road, London, W.6. CLINICAL ASSISTANT (rheumatism) required for 1 session per week (Thursday mornings). Salary £175 p.a.

Applications, stating age, qualifications, experience, copies of 2 recent testimonials, to Secretary, Board of Governors, The Hammersmith, West London and St. Mark's Hospitals, 150, Ducane-road, London, W.12. by 23rd February.

WEST LONDON HOSPITAL, Hammersmith-road, London, W.6. REGISTRAR (rheumatism) required for 2 sessions per week (Tuesday and Wednesday mornings).

Applications, stating age, qualifications, experience, names of 2 referees, to Secretary, Board of Governors, The Hammersmith, West London and St. Mark's Hospitals, 150, Ducane-road, London, W.12, by 23rd February.

WHIPPS CROSS HOSPITAL, London, E.11. Leytonstone (NO. 10 GROUP) HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the posts of 2 HOUSE OFFICERS (general medicine), both posts falling vacant on 6th April, 1953. 1 is recognised for experience during pre-registration period.

Application forms from the Medical Superintendent, to be returned by first post 23rd February, 1953.

WHIPPS CROSS HOSPITAL, London, E.11. Leytonstone (NO. 10 GROUP) HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the posts of 2 HOUSE OFFICERS (general surgery), falling vacant on 30th March and 1st April respectively. The Hospital is recognised for the F.R.C.S. examination and the posts for experience during pre-registration period.

Application forms from the Medical Superintendent to be returned by first post 23rd February, 1953.

WHIPPS CROSS HOSPITAL, London, E.11. Leytonstone (NO. 10 GROUP) HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE PHYSICIAN (paediatrics), which becomes vacant on 1st April, 1953. The Hospital is recognised for the D.C.H. examination.

Application forms from the Medical Superintendent, to be returned by first post 23rd February, 1953.

ABERDEEN GENERAL HOSPITALS BOARD OF MANAGEMENT. Applications are invited for the appointment of a REGISTRAR in General Surgery at Aberdeen Royal Infirmary and Woodend General Hospital. Conditions of service in accordance with the terms issued by the Department of Health for Scotland.

Applications, with the names of 2 referees, should be lodged with the Secretary, Aberdeen General Hospitals, 62, Queen's-road, Aberdeen, within 14 days of the appearance of this advertisement.

ACCRINGTON. VICTORIA HOSPITAL. (112 acute beds.) HOUSE PHYSICIAN required to take up duty at this busy general hospital on or about 1st March, 1953. Pre-registration post. National Health Service salary and conditions of service.

Applications should be sent to the Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

ASHFORD HOSPITAL, Ashford, Middlesex. Staines GROUP HOSPITAL MANAGEMENT COMMITTEE. 2 RESIDENT HOUSE SURGEONS (Male) required at above Hospital for general surgical duties. 6 months appointments. Preference given to pre-registration candidates. National Health Service salary and conditions of service.

Applications, stating age, qualifications, and experience, with copies of up to 3 recent testimonials, to Medical Director of Hospital as soon as possible.

ASHFORD HOSPITAL, Ashford, Kent. Applications are invited for the appointment of RESIDENT HOUSE SURGEON, which will become vacant on or about 16th February, 1953, at the above Hospital. Salary £350, £400, or £450 a year according to experience. A deduction of £100 a year will be made in respect of residential emoluments.

Applications, stating age, qualifications, and the names and addresses of 2 referees, to the Group Secretary, South East Kent Hospital Management Committee, "Ash-Eton," Radnor Park West, Folkestone.

ASHFORD (near), KENT. WILLESBOROUGH HOS-PITAL. Applications are invited for the appointment of HOUSE SURGEON which is now vacant at the above Hospital. Good experience in general surgery with some casualty work. Salary £350, £400, or £450 a year, less £100 a year for residential emoluments.

Applications, stating age, qualifications, and the names and addresses of 2 referees, should be forwarded to the Group Secretary, South East Kent Hospital Management Committee, "Ash-Eton," Radnor Park West, Folkestone.

ASHTON, HYDE, AND GLOSSOP HOSPITAL MANAGE-MENT COMMITTEE. Applications are invited for the following appointments :—

Ashton under Lyne General Hospital (800 Beds)

HOUSE SURGEON (general surgery), vacant now. Recognised for F.R.C.S. Eng.

E.N.T. SURGEON (Senior House Officer grade), vacant now.

CASUALTY OFFICER (resident or non-resident). Recognised for F.R.C.S. Eng.

Manchester Regional Hospital Board

REGISTRAR in Radiology (resident or non-resident) in the Ashton Hyde, and Glossop group and Oldham and District Group of hospitals. Vacant now.

Appointments subject to Ministry of Health terms and conditions of service.

Applications, giving age, nationality, qualifications and experience, with copies of 3 testimonials, should be forwarded to R. W. MCVITY, Group Secretary.

Astley-road, Stalybridge, Cheshire.

AYLESBURY. ROYAL BUCKINGHAMSHIRE HOS-PITAL. HOUSE SURGEON for Accident and Orthopædic Department, which is centred upon this Hospital and comprises 40 Beds. Vacant now.

Applications, with 2 testimonials, to Secretary-Superintendent as soon as possible.

AYLESBURY. TINDAL GENERAL HOSPITAL. (276 Beds.) HOUSE SURGEON (Male or Female), vacant 1st April, pre-registration post, but registered practitioners invited to apply. The post offers wide experience of general surgery with operative practice. Recognised for F.R.C.S. Acute Surgical Unit of 95 Beds, no Casualty Department.

Apply, with 2 testimonials, to the Administrative Officer.

AYLESBURY. TINDAL GENERAL HOSPITAL. (276 Beds.) HOUSE PHYSICIAN (Chest Unit). Second or third post. Male or Female. Vacant 1st March, 1953. Duties include care of about 20 chest cases (including T.B. chalets) which may increase in due course, and 4 Clinics weekly, including refills, forming a progressive Chest Unit for the Aylesbury area. Instruction in bronchoscopy and bronchography given. An Acute Geriatric Unit and a Medical Outpatient Clinic provide some general medicine.

Please apply with 2 testimonials to Administrative Officer as soon as possible.

BARNET (near). CLARE HALL HOSPITAL, South MIMMS, BARNET, HERTS. (304 Beds for tuberculosis and diseases of the chest, including 76 Beds for thoracic surgery—tuberculous and non-tuberculous.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. MEDICAL REGISTRAR required at above Hospital. Post vacant 13th April, 1953. Duties mainly medical, but some allocation of time to surgical wards. Good training in general medicine essential, and experience in diseases of the chest desirable. Hospital may be visited by direct appointment.

Application forms obtainable from, and returnable to, Group Secretary, Barnet Group Hospital Management Committee, 1, Wellhouse-lane, Barnet, Herts, by 4th March, 1953.

BARNET GENERAL HOSPITAL, Wellhouse-lane, Barnet, HERTS. (478 Beds.) RESIDENT HOUSE PHYSICIAN required for the Department of Medicine. Post vacant 1st March, tenable for 6 months. Preference will be given to persons seeking pre-registration posts under the Medical Act, 1950.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to be sent to the Hospital Secretary.

BARROW AND FURNESS HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for a resident post of SENIOR HOUSE OFFICER in the Obstetrical and Gynæcological Department of the Group, to be based at the Risedale Maternity Hospital, Barrow-in-Furness. Hospital recognised for D.Obst.R.C.O.G. National salary and conditions of service (with deduction of £155 p.a. for emoluments).

Applications, stating age, qualifications, and experience, with 2 recent copy testimonials, to be forwarded to the Group Secretary, 52, Paradise-street, Barrow-in-Furness.

BEDFORD GENERAL HOSPITAL. (434 Beds.) North WEST METROPOLITAN REGIONAL HOSPITAL BOARD. ANÆSTHETIC REGISTRAR required at above Hospital, whole-time, resident. Candidates may visit the Hospital by direct appointment. Post vacant 23rd March, 1953.

Application forms obtainable from, and returnable to, Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford, by 27th February, 1953.

BEDFORD GENERAL HOSPITAL. (434 Beds.) Bedford GROUP HOSPITAL MANAGEMENT COMMITTEE. RESIDENT HOUSE SURGEON required, vacant on 4th March, 1953. Preference will be given to persons seeking pre-registration posts under the Medical Act, 1950. The appointment offers exceptional opportunities for general experience in a busy Acute Surgical Unit.

Applications, stating age, nationality, qualifications, previous appointments, together with copies of 2 testimonials, should be forwarded to the Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

BIRMINGHAM (near). CANWELL HALL BABIES' HOSPITAL. (60 Beds for babies and children up to the age of 12 years—2 House Physicians, Recognised for D.C.H.) HOUSE PHYSICIAN (Male or Female), vacant 1st April. This post includes attendance at outpatient clinics and neonatal departments in Birmingham Hospitals and a Child Welfare Centre.

Applications for the above appointment should be sent to the Pædiatrician, Sorrento Maternity Hospital, Birmingham, 13, immediately.

BIRMINGHAM, 18. DUDLEY ROAD HOSPITAL. Resident HOUSE PHYSICIAN (recognised for pre-registration) required in a unit of general medicine which is under the control of 2 Consultant Physicians with approximately 80–100 adult general medical beds. Vacant 1st April.

Applications, enclosing copies of 3 recent testimonials, to the Secretary within 7 days from the appearance of advertisement.

BIRMINGHAM REGIONAL HOSPITAL BOARD. Applications invited for the following whole-time appointments :—

(*a*) **Coventry and Warwickshire Hospital** (346 Beds)
Coventry Group of hospitals

(i) REGISTRAR in Obstetrics and Gynæcology. Hospital recognised for M.R.C.O.G. Resident appointment.

(ii) REGISTRAR in Pædiatrics. Duties also at Gulson Hospital (311 Beds). Non-resident appointment.

Experience in specialty essential. Possession of higher qualification an advantage.

(*b*) **Birmingham, Hollymoor Hospital** (746 Beds)
Birmingham (Mental B) Group of hospitals

REGISTRAR in Psychiatry. Post offers good experience in diagnosis and treatment of psychosis and neurosis. Hospital recognised for D.P.M. Resident or non-resident appointment. Experience in specialty essential.

(*c*) **North Staffs Royal Infirmary** (475 Beds)
Stoke-on-Trent Group of hospitals

REGISTRAR in E.N.T. Surgery. Resident or non-resident appointment. Experience in specialty essential.

Application forms from Secretary, Birmingham Regional Hospital Board, 10, Augustus-road, Birmingham, 15, to be returned before 2nd March, 1953.

BIRMINGHAM, 29. SELLY OAK HOSPITAL. (1098 Beds.) Applications are invited for the post of HOUSE SURGEON, available immediately. Recognised for F.R.C.S.

Applications, giving qualifications, experience, and age, with copies of 3 testimonials, to the Medical Superintendent.

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS. GENERAL HOSPITAL. Applications are invited for the post of SURGICAL REGISTRAR (resident), Registrar grade, for duty in the Casualty Department at the above Hospital. The post is tenable for 1 year in the first instance. Candidates must be registered medical practitioners and have held a resident appointment in a Teaching Hospital. Preference will be given to those holding a higher qualification.

Forms of application may be obtained from, and should be returned not later than 2nd March, 1953, to, the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15.

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS. Applications are invited for the post of NON-RESIDENT SENIOR HOUSE OFFICER for duty in the Casualty Department at the General Hospital, Birmingham. The post now vacant is tenable for 1 year. Candidates must be registered medical practitioners, and have held a resident appointment in a Teaching Hospital.

Forms of application may be obtained from, and should be returned as soon as possible to, the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15.

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS. THE BIRMINGHAM MATERNITY HOSPITAL, Lovedaystreet, BIRMINGHAM, 4. OBSTETRIC HOUSE SURGEON required. The appointment is for a period of 6 months and is recognised for the M.R.C.O.G. Duties commence 1st May, 1953.

Application forms can be obtained from the House Governor at the Birmingham and Midland Hospitals for Women, Showell Green-lane, Sparkhill, Birmingham, and should be returned not later than 2nd March, 1953. G. A. PHALP, Secretary.

The United Birmingham Hospitals.

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS. QUEEN ELIZABETH HOSPITAL. Applications are invited for the post of RESIDENT OBSTETRIC AND GYNÆCOLOGICAL REGISTRAR for duties partly at the Queen Elizabeth Hospital (Professorial Unit) and at the General Hospital, to commence as soon as possible.

Forms of application, with details of appointment, may be obtained from, and should be returned not later than 2nd March, 1953, to, the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15.

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS. QUEEN ELIZABETH HOSPITAL. Applications are invited for the post of RESIDENT ANÆSTHETIST (Senior House Officer grade), vacant 1st April, 1953, and tenable for 1 year.

Application forms may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, and should be returned to him not later than 2nd March. 1953.

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS. Applications are invited for the post of RESIDENT REGISTRAR in Anæsthetics (Registrar grade) for duties in the Teaching Group of hospitals. The appointment, tenable for 1 year in the first instance, is a recognised post for the purpose of taking the Diploma in Anæsthetics. Preference will be given to candidates who have passed Part 1 of the D.A.

Application forms may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, and should be returned to him not later than 21st February, 1953.

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS. Applications are invited for the post of NON-RESIDENT REGISTRAR in Dermatology (Registrar grade) for duty in the Teaching Hospital. Tenable for 1 year in the first instance. Candidates must be registered medical practitioners and should have held a resident hospital appointment in medicine or surgery. The possession of the M.R.C.P. will be an advantage.

Forms of application may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, and should be returned as soon as possible.

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS. MIDLAND NERVE HOSPITAL. There is a vacancy for a RESIDENT HOUSE OFFICER (medical) at the above Hospital, which is a constituent hospital of the Teaching Group. Duties will be both neurological (25 Beds) and psychiatric (15 Beds), with corresponding Outpatient Departments. The Hospital is recognised for training for the D.P.M.

Application forms may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, and should be returned to him at once.

BIRMINGHAM. THE UNITED BIRMINGHAM HOS-PITALS. MIDLAND NERVE HOSPITAL. There is a vacancy for a RESIDENT SENIOR HOUSE OFFICER (medical) at the above Hospital, which is a constituent hospital of the Teaching Group. Duties will be both neurological (25 Beds) and psychiatric (15 Beds), with corresponding Outpatient Departments. The Hospital is recognised for training for the D.P.M.

Application forms may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, and should be returned to him at once.

BIRMINGHAM (SANATORIA) GROUP. ROMSLEY HILL SANATORIUM. (130 Beds—including Diabetic Unit of 24 Beds for the treatment of tuberculous diabetics.) Applications invited for appointment of REGISTRAR in Chest Diseases, with some duties at Birmingham Chest Clinic. Successful candidate must be resident. Opportunity will be given to work under each of the 2 Consultants at both Sanatorium and Chest Clinic.

Application forms from the Secretary, Birmingham Regional Hospital Board, 10, Augustus-road, Birmingham, 15, to be returned before 2nd March, 1953.

BISHOP'S STORTFORD, HERTFORDSHIRE. HAY-MEADS HOSPITAL. (350 occupied beds. Midway between London and Cambridge. Main Line from Liverpool Street.) Applications are invited from registered medical practitioners for the following :—

HOUSE OFFICER (Medical), Male or Female (first, second, or third post held), with primary attachment to the Pædiatric Ward of 24 Beds, and other duties in connection with 8 skin beds and Casualty Department. Salary £350–£450 p.a.

HOUSE OFFICER (Medical), Male or Female (first or second post held). Salary £350–£400 p.a.

Both appointments to commence 1st April, 1953, for period of 6 months and subject to residential emoluments of £100 p.a.

Applications, stating nationality, age, qualifications and experience, with copies of recent testimonials or the names of referees, should be sent to the Hospital Secretary as soon as possible.

BISHOP'S STORTFORD, HERTS. HAYMEADS HOSPITAL. (350 occupied beds. Midway between London and Cambridge. Main Line Railway from Liverpool Street.) Applications are invited from registered medical practitioners for the appointment of a Whole-time Temporary REGISTRAR (anæsthetics) at the above Hospital. Appointment to commence immediately, for approximately 6-month period. Salary at the rate of £775–£890 p.a., less £130 p.a. residential emoluments.

Applications, giving fullest details, together with copies of recent testimonials or the names of referees, to the Hospital Secretary.

BISHOP'S STORTFORD, HERTS. HAYMEADS HOSPITAL. (350 occupied beds. Midway between London and Cambridge. Main Line Railway from Liverpool Street.) Applications are invited from registered medical practitioners for the appointment of a Whole-time Temporary SURGICAL REGISTRAR at the above Hospital. Appointment to commence 3rd March, 1953, for a period of 6 months. Salary at the rate of £775–£890 p.a., less £130 p.a. for residential emoluments.

Applications, giving fullest details, together with copies of recent testimonials or the names of referees, to the Administrative Officer.

BISHOP'S STORTFORD AND DISTRICT HOSPITAL, Rye-street, BISHOP'S STORTFORD, HERTS. (67 Beds—medical, surgical, and maternity. Midway between London and Cambridge. Main Line Railway from Liverpool Street.) Applications are invited from registered medical practitioners for a RESIDENT HOUSE OFFICER (first or second post held). Salary £350–£400 p.a., less £100 p.a. for residential emoluments. Appointment to commence 1st March, 1953.

Applications, stating age, nationality, qualifications and experience, with copies of recent testimonials or the names of referees, should be sent to the Administrative Officer, Haymeads Hospital, Bishop's Stortford, Herts.

BOVEY TRACEY (near) SOUTH DEVON. HAWKMOOR CHEST HOSPITAL. (210 Beds.) Required immediately, 2 SENIOR HOUSE OFFICERS, 1 for the medical wards and 1 for the Thoracic Surgical Unit.

Applications, with full particulars, and copies of 3 testimonials, to be sent to the Medical Superintendent.

BOURNEMOUTH. CHRISTCHURCH HOSPITAL. CHILDREN'S UNIT. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of PÆDIATRIC SENIOR HOUSE OFFICER to this Unit. Duties include conduct of an Infant Welfare Centre. The post is recognised for the D.C.H. and will be vacant on 2nd April, 1953.

Applications, with copies of testimonials, should be sent to the Group Secretary, Bournemouth and East Dorset Hospital Management Committee, Royal Victoria Hospital, Shelley-road, Bournemouth, not later than 20th February, 1953.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. ANÆSTHETIST (Senior House Officer) required immediately. The post is recognised for the D.A. and is tenable for 12 months. Salary £670 p.a.

Applications to the Deputy Hospital Secretary at the Hospital.

BRAINTREE, ESSEX. BLACK NOTLEY HOSPITAL. (550 Beds.) Applications invited for post of HOUSE PHYSICIAN (first, second or third post) in the medical and pædiatric wards of the above Hospital. Tenable for 6 months from 1st March. Salary in accordance with the terms of service issued by the Ministry of Health, plus £50 p.a.

Applications, with copies of 3 testimonials, should be forwarded to the Secretary, Colchester Group Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

BRAINTREE, ESSEX. BLACK NOTLEY HOSPITAL. (550 Beds.) Applications invited for post of SENIOR HOUSE OFFICER (anæsthetics). Post tenable for 1 year. The successful candidate may occasionally be called upon to give anæsthetics in other hospitals in the Group. Salary in accordance with the terms of service issued by the Ministry of Health.

Applications, with copies of 3 testimonials, should be forwarded to the Secretary, Colchester Group Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

BRADFORD CHILDREN'S HOSPITAL. (102 Beds.) Locum HOUSE OFFICER (Female), 1st April–31st July. Salary £8 p.w., less residential emoluments at rate of £100 p.a. Hospital recognised for D.C.H.

Applications, stating age, nationality, qualifications and experience, with copy testimonials, to Secretary, Bradford Royal Infirmary.

BRADFORD ROYAL INFIRMARY.

HOUSE SURGEON or SENIOR HOUSE SURGEON (general and urology), vacant 1st March, 1953. Salary £350–£450 p.a., less £100 p.a. residential emoluments, or £670 p.a., less £130 p.a. residential emoluments.

Locum HOUSE SURGEON (general and urology), 16th March–30th April. Salary £8 p.w., less residential emoluments at rate £100 p.a.

HOUSE OFFICER (anæsthetics), vacant 1st April. Salary £350–£450 p.a., less £100 p.a. residential emoluments.

Applications for all above posts, stating age, nationality, qualifications and experience with copy testimonials, to Secretary.

BRADFORD. ST. LUKE'S HOSPITAL.

SENIOR HOUSE OFFICER (pathology), vacant 1st May. Salary £670 p.a., less £130 p.a. residential emoluments.

Locum ORTHOPÆDIC HOUSE SURGEON/CASUALTY OFFICER, vacant now to 31st July. Recognised for F.R.C.S.

Locum HOUSE SURGEON (general and plastic), vacant 1st April–31st July.

Locum HOUSE OFFICER (medicine and dermatology), 1st March–31st July.

Salary for above 3 posts £8 per week, less residential emoluments at the rate of £100 p.a.

Applications for all above posts, stating age, nationality, qualifications and experience, with copy testimonials, to Secretary, Bradford Royal Infirmary.

BRADFORD. ST. LUKE'S HOSPITAL. House Officer (anæsthetics), vacant 1st March. Salary £350–£450 p.a., less £100 p.a. residential emoluments.

Applications, stating age, nationality, qualifications and experience, with copy testimonials, to Secretary, Bradford Royal Infirmary.

BRIGHTON AND LEWES HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON (recognised for F.R.C.S.) for the General Surgical Unit (60 Beds). The post will be vacant 28th February, 1953. Salary in accordance with national scale.

Applications, stating age, qualifications, experience, and naming 2 referees, to the Physician-Superintendent, Brighton General Hospital, Elm-grove, Brighton, 7.

BRIGHTON AND LEWES HOSPITAL MANAGEMENT COMMITTEE. 2 HOUSE SURGEONS for duties in the E.N.T. Department of the Group hospitals (78 Beds), vacant now. Recognised for F.R.C.S. and D.L.O.

Applications, with details of experience, &c., and names and addresses of 2 referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7, as soon as possible.

BRIGHTON, 7. ROYAL SUSSEX COUNTY HOSPITAL. CASUALTY HOUSE SURGEON required (1 of 2—attached to the Orthopædic and Traumatic Unit), now vacant.

Applications, giving details of qualifications, age, and experience, together with the names and addresses of 2 referees, to be sent to the Administrative Officer as soon as possible.

BRIGHTON. SUSSEX EYE HOSPITAL. (56 Beds.) HOUSE SURGEON for above Hospital, vacant immediately. Recognised for D.O. Successful applicant will be considered for senior post (Senior House Officer) on completion of 6 months.

Applications, giving details of qualifications and experience, together with names and addresses of 2 referees, to the Administrative Officer.

BRISTOL. COSSHAM/FRENCHAY HOSPITAL MANAGEMENT COMMITTEE. FRENCHAY HOSPITAL. HOUSE SURGEON required to work in Plastic and Jaw Surgery Unit.

Applications, with full particulars, should be sent to the Group Secretary, Frenchay Hospital, Bristol.

BRISTOL. COSSHAM/FRENCHAY HOSPITAL MANAGEMENT COMMITTEE. FRENCHAY HOSPITAL. (499 staffed beds.) RESIDENT SENIOR HOUSE OFFICER in the Department of Plastic and Jaw Surgery.

Applications, with full particulars, to the Group Secretary, Frenchay Hospital, Bristol.

BLACKBURN. ROYAL INFIRMARY. (244 Beds.) HOUSE SURGEON required to take up duty on or about 1st March, 1953. Approved pre-registration post and recognised for F.R.C.S. National Health Service salary and conditions of service.

Applications should be sent to the Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

BLACKPOOL. VICTORIA HOSPITAL. (347 Beds.) SENIOR HOUSE OFFICER (Department of Anæsthetics), vacant 22nd March, 1953. Recognised for the D.A. This is a busy General Hospital and the post offers excellent opportunities for experience under Consultant Anæsthetists. Salary and conditions of service in accordance with national scale (i.e., £670 p.a.)

Applications, with references, should be sent to the Hospital Secretary, Victoria Hospital, Blackpool.

WALTER R. SMITH, Group Secretary.

BURTON-ON-TRENT GENERAL INFIRMARY. (240 acute beds.) Applications are invited for the following vacancies :—

RESIDENT HOUSE SURGEONS.

(1) General Surgical and Gynæcological Units.

(2) Casualty and Orthopædic Departments.

Both posts offer excellent experience.

Applications, giving full details of age, qualifications, experience, together with testimonials or names for reference, should be addressed to J. E. SMITH, Group Secretary.

BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE.

Bury General Hospital

SENIOR HOUSE OFFICER (orthopædics).

Applications are invited for the above post and should indicate age, nationality, qualifications, and experience, and should be sent to the undersigned as soon as possible.

RESIDENT CLINICAL PATHOLOGIST (Senior House Officer grade) with duties mainly at Bury General Hospital. The post, tenable for 1 year, affords opportunities for gaining experience in all branches of pathology. Salary and conditions of service as Ministry of Health scale.

Applications, stating nationality, age, qualifications, and experience, along with names of 2 referees, should be forwarded immediately to the undersigned at Bury General Hospital, Walmersley-road, Bury, Lancs.

H. WILKINSON, Group Secretary.

Bury General Hospital, Bury, Lancs.

BURY ST. EDMUNDS. WEST SUFFOLK GENERAL HOSPITAL. (290 Beds.) Applications are invited for the following posts, all of which are open to pre-registration practitioners :—

(*a*) HOUSE SURGEON for casualty and orthopædic duties. Recognised for F.R.C.S. Vacant immediately.

(*b*) HOUSE SURGEON for gynæcological and obstetric duties. Vacant late February.

(*c*) HOUSE SURGEON for ophthalmic and E.N.T. duties, together with casualty and general surgical duties. Vacant immediately.

Full details, including testimonials, to the Hospital Secretary.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (265 Beds.) E.N.T. AND EYE HOUSE SURGEON. The above post, which is recognised for the D.L.O. and D.O.M.S. examinations, is now vacant. National Health Service salary and conditions.

Applications to be addressed to the Hospital Secretary at the above Hospital.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (265 Beds.) GENERAL SURGICAL AND UROLOGICAL HOUSE SURGEON. The above post, which is recognised for the F.R.C.S. Diploma, is now vacant. National Health Service salary and conditions.

Applications to be addressed to the Hospital Secretary at the above Hospital.

CAMBORNE. TEHIDY HOSPITAL. (189 Beds.) West CORNWALL HOSPITAL MANAGEMENT COMMITTEE. There is a vacancy for a RESIDENT HOSPITAL OFFICER for which applications are invited from registered medical practitioners. Practitioners convalescent from tuberculosis will be favourably considered. This is an appointment which offers good scope in this branch of medicine.

Applications, together with copies of 2 recent testimonials, should be addressed to the Hospital Secretary, Tehidy Hospital, Camborne.

CAMBRIDGE. ADDENBROOKE'S HOSPITAL. Resident ANÆSTHETIC HOUSE OFFICER for 6 months. Recognised pre-registration service.

Apply, stating age, nationality, qualifications and experience, with dates, and copies of 3 testimonials to Secretary by 21st February.

CAMBRIDGE. ADDENBROOKE'S HOSPITAL. Gynæco-LOGICAL HOUSE SURGEON for 6 months from 1st April, 1953. Recognised pre-registration service.

Apply, stating age, nationality, qualifications and experience, with dates, and copies of 3 testimonials, to Secretary by 21st February. Interviews 3rd March.

CARDIFF. ST. DAVID'S HOSPITAL. (656 Beds.) Cardiff HOSPITAL MANAGEMENT COMMITTEE. RESIDENT HOUSE OFFICER required immediately for Accident Unit.

Applications to Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

CARMARTHEN. WEST WALES GENERAL HOSPITAL. (160 Beds). Applications are invited for the post of RESIDENT HOUSE OFFICER (medical). Salary £350, £400, £450 p.a., according to experience, less £100 p.a. for board-residence.

Applications, stating age, qualifications, experience, and nationality, with names and addresses of 3 referees to Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

CARMARTHEN. WEST WALES GENERAL HOSPITAL. (160 Beds.) RESIDENT HOUSE OFFICER (surgical—recognised by Royal College of Surgeons) required at the above Hospital. Full Consultant staff. Salary £350, £400, or £450 p.a. according to experience, less £100 for residence. 6 months appointment.

Applications stating age, nationality, qualifications and experience, with names of 3 referees, to the Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

CARSHALTON, SURREY. ST. HELIER HOSPITAL. (832 Beds.) ST. HELIER GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE SURGEON (Senior House Officer) to 1 of the 2 General Surgical Units comprising 70 Beds. Vacant now.

Applications, stating age, qualifications and experience, with copies of recent testimonials and the name of 1 referee, should be sent to the Group Secretary, St. Helier Hospital, Carshalton, Surrey.

CARSHALTON, SURREY. QUEEN MARY'S HOSPITAL FOR CHILDREN. (840 Beds.) SENIOR HOUSE OFFICER required for medical duties.

Applications, stating age, qualifications, and experience, with copies of 3 testimonials, should reach the Secretary by 28th February, 1953.

CHELTENHAM GENERAL HOSPITAL. (220 Beds.) Applications are invited for the appointment of SENIOR HOUSE OFFICER (casualty). Salary £670 p.a., less £125 emoluments. The appointment will be tenable for 1 year in the first instance.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary, General Hospital, Cheltenham.

CHESTERFIELD ROYAL HOSPITAL. Senior House OFFICER required in Accident and Orthopædic Department of the above Hospital. National salary and conditions.

Applications to— M. H. BOONE, Secretary,
Chesterfield Hospital Management Committee.

CHESTERFIELD ROYAL HOSPITAL. (324 Beds.) A RESIDENT ANÆSTHETIST (Senior House Officer grade) is required immediately at the above Hospital. The post is recognised for the D.A. examination. Experience in all types of anæsthetics, except neurosurgery, can be obtained at this Hospital. The salary payable is £670 p.a., less a deduction for residential emoluments.

Please write for interview to—
M. H. BOONE, Secretary,
Chesterfield Hospital Management Committee.

CHESTER. BARROWMORE HOSPITAL, Great Barrow, CHESTER. (205 Beds.) SENIOR HOUSE OFFICER (Male). Post vacant immediately. Salary £670, subject to deduction of £120 p.a. for residence. The Hospital is modern in all respects and contains Regional Thoracic Surgical Unit.

Apply immediately, sending 2 references or names of referees, to Secretary.

CHESTER. DEVA HOSPITAL (Mental), Liverpool-road, CHESTER. PSYCHIATRIC SENIOR HOUSE OFFICER required. Salary £670 p.a. Accommodation available for single man. All forms of modern treatment available including Insulin Unit. There are Psychiatric Outpatient Clinics at 3 general hospitals, Occupational Therapy Units and voluntary treatment wards. Facilities given to study for higher qualifications.

Apply Medical Superintendent.

CHESTER ROYAL INFIRMARY. XIII Chester and DISTRICT HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER required for the Orthopædic and Casualty Departments, duties to commence on 16th March, 1953. This appointment has been made for the purpose of combining the work of these 2 Departments to form an effective Accident and Casualty Service. Previous orthopædic experience will be an advantage. A deduction of £150 p.a. will be made in respect of board and lodging, &c.

Applications, giving details of age, experience, and qualifications, together with the names and addresses of 2 referees, should be sent to the Group Secretary, 5, King's Buildings, Chester.

CHESTER (near). MEADOWSLEA HOSPITAL. WREXHAM, POWYS AND MAWDDACH HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER (resident). Salary £700–£1000 p.a., less recognised charge for services provided by Hospital. The appointed candidate will be a member of a chest team covering a wide area in North Wales with excellent opportunities for experience in hospital and chest clinic practice. A flat is available for the successful candidate.

Applications, stating age, qualifications, experience, together with the names of 3 referees, to the Secretary, Wrexham, Powys and Mawddach Hospital Management Committee, Maelor General Hospital, Wrexham, within 14 days.

CHICHESTER. ST. RICHARD'S HOSPITAL. (400 Beds.) Applications are invited for the post of HOUSE PHYSICIAN for 6 months only in the first instance. Post vacant 7th March. The man or woman appointed will work primarily in the medical wards of the Hospital.

Applications, stating age, qualifications and experience, together with names of 2 referees, should be sent to the Surgeon Superintendent immediately.

COLCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. SENIOR REGISTRAR (radiology) required on 1st April, 1953. Possession of D.M.R. desirable. The appointment, which is non-resident, includes radiodiagnostic duties mainly at Essex County Hospital, Colchester, but including duties at other hospitals in the Group, under the direction of the Consultant Radiologist. The post offers considerable scope in general diagnostic work. The appointment is for 6 months in the first instance and is subject to the terms and conditions of service of hospital medical staff.

Applications, with copies of 3 recent testimonials, should be sent to the Group Secretary, 14, Pope's-lane, Colchester.

COVENTRY AND WARWICKSHIRE HOSPITAL. (346 Beds.) HOUSE OFFICER in General Surgery required (94 Beds), vacant mid-March. Pre-registration post; recognised for F.R.C.S. Excellent experience in all types of general surgery.

Applications to the Secretary, Group 20 Hospital Management Committee, Coventry and Warwickshire Hospital, Coventry.

COTTINGHAM, near HULL. CASTLE HILL HOSPITAL. HOUSE SURGEON (Senior House Officer grade) for Major Thoracic Surgery Unit at above Hospital, to work under the supervision of the Consultant Thoracic Surgeon. Unit part of Group incorporating Mass Radiography Unit and full laboratory facilities.

Application forms obtainable from Group Secretary, Hull B Hospital Management Committee, De la Pole Hospital, Willerby, E. Yorkshire.

COTTINGHAM, near HULL. Senior House Officer for Raywell Sanatorium (48 Beds) and HOUSE OFFICER for Castle Hill Sanatorium (221 Beds) to work under supervision of Consultant Chest Physician. Sanatoria part of Group with Major Thoracic Surgery and Mass Radiography Units and laboratory facilities.

Application forms from Group Secretary, Hull B Hospital Management Committee, De la Pole Hospital, Willerby, E. Yorkshire.

CROYDON GENERAL HOSPITAL (200 Beds.) Locum Tenens REGISTRAR ANÆSTHETIST from 16th March to 8th April.

Apply immediately giving particulars of qualifications and experience to— GEORGE A. PAINES, Secretary
Croydon Group Hospital Management Committee.
General Hospital, Croydon.

CROYDON. MAYDAY HOSPITAL. (637 Beds.) Locum Tenens OBSTETRICAL AND GYNÆCOLOGICAL REGISTRAR from 23rd February to 31st March.

Apply immediately, giving particulars of qualifications and experience to— GEORGE A. PAINES, Secretary,
Croydon Group Hospital Management Committee.
General Hospital, Croydon.

CROYDON. MAYDAY HOSPITAL. (637 Beds.) CROYDON GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for appointment of HOUSE PHYSICIAN for a period of 6 months in the first instance from 1st March.

Form of application obtainable from GEORGE A. PAINES, Secretary, Hospital Management Committee, General Hospital, Croydon, to be returned immediately.

DARTFORD HOSPITAL MANAGEMENT COMMITTEE.
HOUSE OFFICER (E.N.T. and ophthalmology) at The Southern Hospital, Dartford.
HOUSE OFFICER (chest diseases) at The Bow Arrow Hospital, Dartford.

Applications, stating age, qualifications, experience, nationality, and the names of 2 persons to whom reference may be made, to be sent to the Medical Superintendent of the hospital concerned.

DORCHESTER. DORSET COUNTY HOSPITAL. (113 Beds.) HOUSE SURGEON required, Male or Female, post now vacant and tenable for 6 months.

Applications, giving details of age, experience, qualifications and nationality, together with copies of testimonials, to the Group Secretary, West Dorset Group Hospital Management Committee, Damers-road, Dorchester, Dorset, immediately.

DERBY CITY HOSPITAL. Sheffield Regional Hospital BOARD. Applications are invited from registered medical practitioners for the resident whole-time post of REGISTRAR (obstetrics) to the above Hospital, which is recognised for training in obstetrics for the D.Obst.R.C.O.G. and the M.R.C.O.G. The appointment is for 1 year in the first instance and may be renewed for a further year.

Applications, giving age, nationality, qualifications, present and previous appointments with dates, together with names and addresses of 3 referees, should be sent to the Secretary, Sheffield Regional Hospital Board, Fulwood House, Old Fulwood-road, Sheffield, 10, to arrive not later than 2nd March, 1953.

DOUGLAS. NOBLE'S ISLE OF MAN HOSPITAL. (160 Beds.) Applications are invited for the post of HOUSE SURGEON at this busy General Hospital. The post becomes vacant at the end of February, 1953, and offers wide experience in congenial surroundings. Salary at the rate of £350, £400, or £450 a year, according to experience, subject to a deduction of £100 a year in respect of residential emoluments. There are 4 residents on the staff. The appointment is tenable for 6 months in the first instance.

Applications, giving full particulars, with copies of 2 recent testimonials, to the Secretary, Noble's Hospital, Douglas, Isle of Man.

DOVERCOURT, ESSEX. HARWICH AND DISTRICT HOSPITAL. (30 Beds.) Applications invited for appointment of SENIOR HOUSE OFFICER (Resident Surgical Officer). Tenable for period of 1 year. Salary in accordance with the terms of service issued by the Ministry of Health.

Applications, with copies of 3 testimonials, should be forwarded to the Secretary, Colchester Group Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

DUDLEY, STOURBRIDGE AND DISTRICT HOSPITAL GROUP. BIRMINGHAM REGION. Applications invited from registered practitioners for following appointments :—

Corbett Hospital, Stourbridge (106 Beds)
CASUALTY OFFICER. Post now vacant.

Wordsley Hospital, near Stourbridge (478 Beds)
SENIOR HOUSE OFFICER (resident), surgical, post now vacant. Salary £670 p.a., less £150 p.a. in respect of residential emoluments.

Applications, stating age, experience, with copies of 3 recent testimonials, to—
H. RAYMOND HURST,
Secretary to the Management Committee.
The Guest Hospital, Dudley.

EASTBOURNE. ST. MARY'S HOSPITAL. (261 Beds.) Applications are invited from registered medical practitioners for the post of GYNÆCOLOGICAL HOUSE SURGEON (28 Beds) with duties in abnormal Obstetric Unit. Staff of 5 House Officers.

Applications, stating age, nationality, qualifications, and experience, together with copies of 2 recent testimonials, to the Secretary, 29, Bedfordwell-road, Eastbourne.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. EXETER AND MID-DEVON HOSPITALS MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners (Male and Female) for the post of CASUALTY OFFICER and to act as House Surgeon to the E.N.T. Department, with alternate week-ends on duty for the Obstetric and Gynæcological Department. Vacant 16th February, 1953. The appointment is for a period of 6 months.

Applications, with copies of 2 recent testimonials, should be forwarded to the Hospital Secretary immediately.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. EXETER AND MID-DEVON HOSPITALS MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners (Male and Female) for the post of HOUSE SURGEON, vacant 18th February, 1953. The appointment is for a period of 6 months, and is a recognised pre-registration post.

Applications, with copies of 2 recent testimonials, to be forwarded immediately to the Hospital Secretary.

EXETER CLINICAL AREA. Whole-time Locum Senior SURGICAL REGISTRAR required immediately in the Exeter Clinical Area for a period of 2–3 months based at the Royal Devon and Exeter Hospital.

Applications in writing, stating age, qualifications, and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the South-Western Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, at once.

EDGWARE, MIDDLESEX. NORTH LONDON BLOOD TRANSFUSION CENTRE. JUNIOR HOSPITAL MEDICAL OFFICER required for full-time duty to work with mobile teams at donor sessions. Opportunity for training in clinical pathology exists.

Applications, stating age, qualifications and experience, together with names of 2 referees, to Group Secretary, Hendon Group Hospital Management Committee, Edgware General Hospital, Edgware, Middlesex, not later than 28th February, 1953.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. ENFIELD GROUP HOSPITAL MANAGEMENT COMMITTEE. RESIDENT SENIOR HOUSE OFFICER in Anæsthetics required, vacant 12th April, 1953. Post recognised for the D.A. 12 months appointment.

Applications, stating age, nationality, qualifications, past and present appointments, and the names of 2 referees, to the Secretary of the Management Committee by 27th February, 1953.

GLOUCESTER. GLOUCESTERSHIRE ROYAL HOS-PITAL, Great Western-road, GLOUCESTER. (316 Beds.) HOUSE OFFICER or SENIOR HOUSE OFFICER (according to experience) required in Orthopædic and Traumatic Surgery Department at the above Hospital. Staff : 1 Registrar, 2 House Officers. Unit comprises 75 active beds. Post vacant now.

Applications, naming 2 referees, to the Group Secretary, Gloucestershire Royal Hospital, Southgate-street, Gloucester.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. ORTHOPÆDIC REGISTRAR, East Suffolk and Ipswich Hospital (360 Beds) and Ipswich Borough General Hospital (300 Beds). Post provides wide experience and training in orthopædic surgery. Appointment for 1 year, renewable for second year.

Applications stating age, qualifications and details of present and previous appointments, together with the names of 3 referees, to Secretary of Board, 117, Chesterton-road, Cambridge, by 23rd February, 1953. Candidates invited to visit the hospitals by direct arrangement with the Hospital Management Committee Secretary, East Suffolk and Ipswich Hospital.

GREAT YARMOUTH AND GORLESTON GENERAL HOSPITAL. NORFOLK AND NORWICH GROUP. EAST ANGLIAN REGIONAL HOSPITAL BOARD. SURGICAL REGISTRAR. The post offers wide experience in all aspects of general surgery. Appointment for 1 year renewable for second year.

Applications, stating age, qualifications, and details of present and previous appointments, together with the names of 3 referees, to Secretary of Board, 117, Chesterton-road, Cambridge, by 2nd March, 1953. Candidates invited to visit the Hospital by direct arrangement with the Secretary-Superintendent at the Hospital.

GREAT YARMOUTH AND GORLESTON GENERAL HOSPITAL, DENE SIDE, GREAT YARMOUTH. 2 vacancies at the above Hospital for HOUSE SURGEONS (Male or Female). The Hospital is staffed by a Consultant General Surgeon, and a Consultant E.N.T. Surgeon and is regularly visited by Consultant staff from the Norfolk and Norwich Hospital, Norwich. Salary in both cases £350, £400, or £450 according to experience, less £100 for residential emoluments.

Applications, stating age, qualifications, experience, with names of 2 referees, to Secretary of Hospital.

GRIMSBY GENERAL HOSPITAL. (220 Beds.) Grimsby HOSPITALS MANAGEMENT COMMITTEE. Applications are invited for the post, now vacant (and recognised for the D.L.O.), of SENIOR HOUSE OFFICER, with duties in Surgical and E.N.T. Departments.

Applications, with names of 2 referees, to Hospital Secretary, Grimsby General Hospital.

HALIFAX AREA HOSPITALS MANAGEMENT COM-MITTEE. 2 SENIOR HOUSE OFFICERS required in the Anæsthetic Departments at Royal Halifax Infirmary (301 Beds) and Halifax General Hospital (425 Beds) ; both busy acute general hospitals. Opportunities for studying for D.A. Salary £670 p.a., with deduction of £130 p.a. for residence, &c.

Applications, stating age, qualifications, and experience, with copies of 2 recent testimonials, to be forwarded to Group Secretary, Royal Halifax Infirmary, Halifax, Yorkshire.

HALIFAX GENERAL HOSPITAL. (86 midwifery beds : 40 gynæcological beds.) SENIOR HOUSE OFFICER in Obstetrics and Gynæcology required. Male or Female. Post vacant 31st March. Recognised for M.R.C.O.G. 1450 deliveries annually. Duties also at Royal Halifax Infirmary (46 midwifery beds and 10 gynæcological beds ; 530 deliveries annually). Salary £670 p.a., with deduction of £130 p.a. for residence, &c.

Applications to Group Secretary, Royal Halifax Infirmary, Halifax, Yorkshire.

HAREFIELD HOSPITAL, Harefield, Middlesex. North WEST METROPOLITAN REGIONAL HOSPITAL BOARD. MEDICAL REGISTRAR required at above Hospital. Previous experience in general medicine and in the treatment of tuberculosis essential. The Hospital has approximately 450 Beds for the treatment of tuberculosis in all its forms, a non-tuberculosis Thoracic Surgical Unit of 100 Beds and 100 general medical and surgical beds. Hospital may be visited by direct appointment.

Application forms obtainable from, and returnable to, the Secretary, Harefield and Northwood Group Hospital Management Committee, Mount Vernon Hospital, Northwood, Middlesex, by 24th February, 1953.

HAVERFORDWEST. PEMBROKE COUNTY WAR MEMORIAL HOSPITAL. (162 Beds—recognised by Royal College of Surgeons.) Applications are invited for the post of RESIDENT HOUSE OFFICER (surgical). Salary £350, £400, £450 p.a., according to experience, less £100 p.a. for board and residence.

Applications, stating age, qualifications, experience, and nationality, with names and addresses of 3 referees, to Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

HAVERFORDWEST. PEMBROKE COUNTY WAR MEMORIAL HOSPITAL. (162 Beds.) Applications are invited for the post of RESIDENT HOUSE OFFICER (medical). Salary £350, £400, £450 p.a., according to experience, less £100 p.a. for board-residence.

Applications, stating age, qualifications, experience, and nationality, with names and addresses of 3 referees, to Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

HILLINGDON HOSPITAL, near Uxbridge, Middlesex. HOUSE PHYSICIAN (resident) required at above Hospital, 6 months appointment, recognised for M.D. (Lond.), Branch I, and for pre-registration House Officers. Whole-time duties under the Medical Director.

Application, stating age, qualifications, nationality and experience, with copies of not more than 3 recent testimonials, to Medical Director by 23rd February.

HITCHIN HOSPITALS, Hitchin, Herts. Applications are invited for the post of RESIDENT HOUSE SURGEON at the Lister Hospital, vacant at the end of February. Preference will be given to candidates seeking pre-registration posts under the Medical Act, 1950.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, should be sent to the Medical Director, The Lister Hospital, Hitchin, Herts.

HASTINGS. ROYAL EAST SUSSEX HOSPITAL. (150 Beds.) CASUALTY AND ORTHOPÆDIC HOUSE SURGEON. Post now vacant. National scale of salary.

Apply to Hospital Administrator.

HASTINGS AND ST. LEONARDS. BUCHANAN HOSPITAL. (94 Beds.) SENIOR HOUSE OFFICER required for Urology and Children's Surgery; post vacant now, is recognised for F.R.C.S., may be tenable for 6 or 12 months. National scale of salary.

Apply to Hospital Administrator.

HASTINGS. ST. HELEN'S HOSPITAL. (453 Beds.) HOUSE PHYSICIAN. Pre-registration post now vacant, Male or Female, resident. National scale of salary.

Apply to Hospital Administrator.

HUDDERSFIELD ROYAL INFIRMARY. (312 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER in Ophthalmology (non-resident), to commence duties immediately. The post is recognised for the Diploma in Ophthalmology. Salary in accordance with the terms and conditions of service for hospital medical and dental staffs.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, should be sent to the undersigned as soon as possible.

H. J. JOHNSON, Secretary to the Management Committee.

The Royal Infirmary, Huddersfield.

HUDDERSFIELD. ST. LUKE'S HOSPITAL. (262 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT MEDICAL OFFICER (Junior Hospital Medical Officer grade) at the above Hospital, to commence duties on 16th March, 1953. Salary in accordance with the terms and conditions of service for hospital medical and dental staffs—£700–£50–£1000.

Applications, together with copies of 3 recent testimonials, to be sent to the undersigned as soon as possible.

H. J. JOHNSON, Secretary,
Huddersfield Hospital Management Committee.

The Royal Infirmary, Huddersfield.

HULL. VICTORIA HOSPITAL FOR SICK CHILDREN, Park-street. **(143 Beds.)** HULL A GROUP HOSPITAL MANAGEMENT COMMITTEE. **Applications are invited for the following posts :—**

HOUSE SURGEON, vacant 8th March, 1953.

HOUSE PHYSICIAN, vacant approximately 23rd March, 1953.

6 months term in each case ; both count towards qualification D.C.H. Salary in accordance with M.O.H. terms of service.

Applications, with testimonials, to the Hospital Secretary, at the above address.

HULL ROYAL INFIRMARY. Hull A Group Hospital MANAGEMENT COMMITTEE. Applications are invited for the following posts :—

2 HOUSE SURGEONS (1 Parent Hospital, 1 Sutton Branch Hospital). Recognised for F.R.C.S.

ORTHOPÆDIC HOUSE SURGEON.

CASUALTY OFFICER (Senior House Officer grade).

E.N.T. HOUSE SURGEON (recognised for F.R.C.S., and D.L.O.).

Applications to the Hospital Secretary.

IPSWICH. BOROUGH GENERAL HOSPITAL, Heath-road. **(275 Beds.)** Applications are invited for the post of HOUSE SURGEON. The post, which is recognised for the R.C.S. examinations, is normally of 6 months duration and is of House Officer grade.

Applications, stating experience, and with copies of recent testimonials, to Hospital Secretary.

ISLE OF WIGHT GROUP HOSPITAL MANAGEMENT COMMITTEE.

CASUALTY OFFICER, St. Mary's Hospital, Newport (365 Beds). Salary £670, less £130 for accommodation and services. Model Casualty Department, newly constructed.

HOUSE SURGEON, Royal I.W. County Hospital, Ryde (119 Beds). Post recognised for F.R.C.S. and approved for pre-registration service. Salary on national scale.

Applications, with full details, to Chief Administrative Officer, Clatterford House, Carisbrooke, I.W.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. South WEST MIDDLESEX HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required for Orthopædic Unit. Post recognised for F.R.C.S. Resident, full-time. Preference will be given to pre-registration candidates.

Applications, stating age, nationality, qualifications and experience, with copies of up to 3 recent testimonials, to Group Secretary, West Middlesex Hospital, Isleworth, Middlesex, by 24th February, 1953.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. South WEST MIDDLESEX HOSPITAL MANAGEMENT COMMITTEE. HOUSE OFFICER (third post), resident, Department of Dermatology. Candidates with some experience of dermatology will be given preference.

Applications, stating age, nationality, qualifications and experience, with copies of up to 3 recent testimonials, to Group Secretary, West Middlesex Hospital, Isleworth, Middlesex. Closing date 24th February, 1953.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. (1200 Beds.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Whole-time SURGICAL REGISTRAR required at above Hospital. Candidates may visit Hospital by direct appointment.

Application forms obtainable from, and returnable to, Secretary, South West Middlesex Group Hospital Management Committee, West Middlesex Hospital, Isleworth, by 26th February, 1953.

KIDDERMINSTER AND DISTRICT GENERAL HOSPITAL. (Recognised hospital for pre-registration service.) RESIDENT HOUSE SURGEON required for this acute general hospital. Post vacant immediately.

Applications with the names of 3 referees to the Hospital Secretary.

LANCASTER. ROYAL LANCASTER INFIRMARY. (230 Beds.) Applications are invited from registered medical practitioners for the appointment of RESIDENT SENIOR HOUSE OFFICER (casualty). Post vacant now, and normally tenable for 1 year. The successful applicant will be attached to the specialist Orthopædic Unit.

Applications, with full particulars and names of 2 referees, to be addressed to the Secretary, Royal Lancaster Infirmary, Lancaster.

LEAMINGTON SPA. WARNEFORD GENERAL HOSPITAL. (General—207 Beds.) SOUTH WARWICKSHIRE HOSPITAL GROUP (NO. 14). Applications are invited from registered medical practitioners for the appointment of OBSTETRIC AND GYNÆCOLOGICAL HOUSE SURGEON (House Officer grade—second or third post). Post vacant on 3rd March, 1953. Post recognised for D.Obst.R.C.O.G.

Applications to be sent to Miss V. WELLS, Hospital Secretary.

LEEDS REGIONAL HOSPITAL BOARD invites applications for the following REGISTRAR posts :—

Anæsthetics

(*a*) Hull A Group with additional duties at hospitals in Hull B and East Riding Groups (non-resident).

(*b*) Huddersfield Group (resident or non-resident).

(*c*) York A and Tadcaster Group (non-resident).

Chest Diseases

(*a*) Middleton Hospital, near Ilkley (400 Beds). There are good surgical and radiological facilities and both pulmonary and non-pulmonary cases are treated. Residential accommodation is available for a single person.

(*b*) Scotton Banks Sanatorium, Knaresborough (resident).

General Medicine

Rheumatism Centre, Harrogate, and the Rheumatism Clinic at Leeds General Infirmary (non-resident). This appointment offers considerable scope for experience in rheumatic diseases.

Infectious Diseases

Leeds Road Hospital, Bradford (resident).

Obstetrics and Gynæcology

Dewsbury, Batley and Mirfield Group (resident)—not yet recognised for M.R.C.O.G.

Orthopædic Surgery

(*a*) Pontefract and Castleford Group (resident).

(*b*) General Hospital, Batley, and other hospitals in the Dewsbury, Batley and Mirfield Group (resident).

(*c*) Bradford Royal Infirmary with additional duties as required at other Orthopædic Units in the Bradford A Group (non-resident).

Otolaryngology

(*a*) Huddersfield and Halifax Groups. Appointment is non-resident but successful candidate will be required to reside in Huddersfield.

(*b*) Hull Royal Infirmary and associated hospitals (non-resident).

Both Departments are recognised for the Fellowship and the D.L.O.

Pathology

(*a*) St. James's Hospital, Leeds, and the Regional Blood Transfusion Centre, Seacroft, Leeds (non-resident). This joint post will give considerable opportunity for experience in all branches of pathology, especially hæmatology.

(*b*) Harrogate and District General Hospital, Harrogate Royal Bath Hospital (rheumatism), and Scotton Banks Hospital, Knaresborough (tuberculosis). (Non-resident.)

Psychiatry

Stanley Royd Hospital, Wakefield (2000 Beds). Residential accommodation is available for a single person.

Applications, stating age, qualifications, and details of present and previous appointments with dates, together with the names of 3 referees, should be forwarded to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, not later than 28th February, 1953.

LEEDS REGIONAL HOSPITAL BOARD invites applications for the appointment of REGISTRAR in Pædiatrics (non-resident) for duties at hospitals in the Huddersfield and Halifax Hospital Management Committee Group.

Applications, stating age, qualifications, and details of present and previous appointments with dates, together with the names of 3 referees, should be forwarded to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, not later than 28th February, 1953.

LEEDS. THE UNITED LEEDS HOSPITALS. Applications are invited for the post of RESIDENT ORTHOPÆDIC OFFICER at the General Infirmary at Leeds. The appointment is graded as Senior House Officer and will be for 1 year in the first instance.

Applications, stating age, sex, nationality, qualifications and previous posts with dates, to be forwarded to the undersigned not later than 28th February, 1953.

S. CLAYTON FRYERS, Secretary to the Board.

The General Infirmary, Leeds.

LEEDS. UNITED LEEDS HOSPITALS. Applications are invited for the post of REGISTRAR to the Department of Venereology, in the General Infirmary at Leeds. Previous experience in this specialty desirable. The post offers good opportunity for training in this specialty and prospect of advancement to Senior Registrar status.

Applications, stating age, qualifications, and details of present and previous posts with dates, giving the names of 3 referees, should be forwarded to the Medical Secretary, Joint Registrars Committee, School of Medicine, Leeds, 2, not later than 27th February, 1953.

LEIGH INFIRMARY, Leigh, Lancs. (102 Beds.) House SURGEON (Male or Female) with some casualty duties, required at the above Hospital. House Officer grade post, recognised for the F.R.C.S. examinations. Post now vacant.

Applications, stating age, qualifications, &c., together with the names of 2 referees, should be received by the Secretary, Wigan and Leigh Hospital Management Committee, Knowsley House, Wigan, as early as possible.

LIVERPOOL, 14. BROADGREEN HOSPITAL. Applications are invited from registered medical practitioners for 2 vacancies as HOUSE SURGEONS in the Thoracic Unit at the above Hospital. The posts are tenable from 1st April, 1953. Salaries at £350–£400–£450, according to experience, less £100 in respect of residential emoluments.

Applications to be made on forms obtainable from, and returnable as soon as possible to, the undersigned at the above address. H. BLYTHE, Group Secretary.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. LIVERPOOL STANLEY HOSPITAL. Applications are invited for a post as RESIDENT HOUSE SURGEON (gynæcological) for the 5 months from 1st April to 31st August, 1953. Persons wishing to obtain diplomas of the R.C.O.G. are advised that this appointment, being on this occasion for 5 months only, will not satisfy the requirements of the College.

Apply as soon as possible on forms obtainable from the Secretary, The United Liverpool Hospitals, 80, Rodney-street, Liverpool, 1.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. ROYAL LIVERPOOL CHILDREN'S HOSPITAL. Applications are invited for a temporary post of REGISTRAR in Psychiatry for the period to 30th September, 1953.

Apply as soon as possible on forms obtainable from the Secretary, The United Liverpool Hospitals, 80, Rodney-street, Liverpool, 1.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. ROYAL LIVERPOOL CHILDREN'S HOSPITAL. Applications are invited for posts as RESIDENT HOUSE PHYSICIANS (pædiatrics) (including the post of House Physician to the Professorial Unit) for the 5 months from 1st April to 31st August, 1953.

Apply as soon as possible on forms obtainable from the Secretary, The United Liverpool Hospitals, 80, Rodney-street, Liverpool, 1.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. ROYAL LIVERPOOL CHILDREN'S HOSPITAL. Applications are invited for a post as RESIDENT HOUSE SURGEON (orthopædic) for the 5 months from 1st April to 31st August, 1953.

Apply as soon as possible on forms obtainable from the Secretary, The United Liverpool Hospitals, 80, Rodney-street, Liverpool, 1.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. ROYAL LIVERPOOL CHILDREN'S HOSPITAL. Applications are invited for a post as JUNIOR CASUALTY OFFICER (House Officer grade) for the 5 months from 1st April to 31st August, 1953.

Apply as soon as possible on forms obtainable from the Secretary, The United Liverpool Hospitals, 80, Rodney-street, Liverpool, 1.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. ROYAL LIVERPOOL CHILDREN'S HOSPITAL. Applications are invited for posts as RESIDENT HOUSE SURGEONS for the 5 months from 1st April to 31st August, 1953.

Apply as soon as possible on forms obtainable from the Secretary, The United Liverpool Hospitals, 80, Rodney-street, Liverpool, 1.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. LIVERPOOL ROYAL INFIRMARY. Applications are invited for appointments as RESIDENT HOUSE SURGEONS for the 5 months from 1st April to 31st August, 1953.

Apply as soon as possible on forms obtainable from the Secretary, The United Liverpool Hospitals, 80, Rodney-street, Liverpool, 1.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. LIVERPOOL ROYAL INFIRMARY; LIVERPOOL STANLEY HOSPITAL. Applications are invited for appointments as RESIDENT HOUSE SURGEONS (orthopædic) for the 5 months from 1st April to 31st August. 1953. Successful applicants will be required to undertake some casualty work as part of their normal duties.

Apply as soon as possible on forms obtainable from the Secretary, The United Liverpool Hospitals, 80, Rodney-street, Liverpool, 1.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. ROYAL SOUTHERN HOSPITAL. Applications are invited for appointments as RESIDENT CASUALTY OFFICERS (House Officer grade) for the 5 months from 1st April to 31st August, 1953.

Apply as soon as possible on forms obtainable from the Secretary, The United Liverpool Hospitals, 80, Rodney-street, Liverpool, 1.

LLANELLY HOSPITAL. (164 Beds.) Glantawe Hospital MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the resident appointment of JUNIOR HOSPITAL MEDICAL OFFICER at the above Hospital, for work in the Medical and Anæsthetic Units.

Applications, stating age, qualifications and experience, should be forwarded to— O. C. HOWELLS, Secretary, Glantawe Hospital Management Committee. St. Helen's-road, Swansea.

LOUTH, LINCS. COUNTY INFIRMARY. (200 Beds.) Applications are invited for the post of HOUSE OFFICER (obstetrics, gynæcology and some other duties) which is now vacant at this busy General Hospital. A deduction of £100 p.a. will be made for residential emoluments.

Applications, giving full particulars, together with names of 2 referees, to be addressed to the Hospital Secretary.

LUTON CHEST CLINIC, Grove-road, Luton. North WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Whole-time REGISTRAR (resident preferred), required at the above Clinic which has medical beds attached at St. Mary's Hospital, Luton. The post also includes duties at the Hitchin Chest Clinic. Post vacant. The Clinic may be visited by direct appointment.

Application forms obtainable from, and returnable to, Secretary, Luton and Hitchin Group Hospital Management Committee, St. Mary's Hospital, Luton, Beds, by 24th February, 1953.

LUTON AND DUNSTABLE HOSPITAL, Luton, Beds. Applications are invited for the appointment of HOUSE SURGEON for Accident Service and Casualty. The post will be for 6 months in the first instance, and is now vacant.

Applications, stating age, nationality, qualifications, and experience, together with copies of 3 recent testimonials, should be sent to the Secretary, immediately.

LINCOLN. BRACEBRIDGE HEATH HOSPITAL for MENTAL DISEASES. (1290 Beds.) Applications are invited for the appointment of JUNIOR HOSPITAL MEDICAL OFFICER (resident or non-resident), Male or Female (married or single). Salary and terms of service as issued by the Ministry of Health. Commencing salary £700 p.a., rising to £1000 p.a. There is furnished or unfurnished accommodation available for a married Officer, or residential accommodation for a single person. There will be scope for work at outpatient clinics and in the use of modern psychiatric methods in the wards. Previous psychiatric experience is not essential. The appointment is subject to the provisions of the National Health Service superannuation regulations.

Applications, with names of 3 referees, should be forwarded as soon as possible to the Medical Superintendent, Bracebridge Heath Hospital, near Lincoln.

LINCOLN COUNTY HOSPITAL. (200 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER in Anæsthetics at the above Hospital. The post is resident; terms and conditions of service in accordance with those laid down for hospital medical and dental staffs.

Apply, stating age, qualifications and experience, to the undersigned as soon as possible.

R. W. HOWICK, Group Secretary,
Lincoln No. 1 Hospital Management Committee.

LINCOLN COUNTY HOSPITAL. Sheffield Regional HOSPITAL BOARD. Applications are invited from registered medical practitioners for the resident whole-time post of REGISTRAR (orthopædics) to the above Hospital, which is a recognised training hospital for the F.R.C.S. The appointment is for 1 year in the first instance and may be renewed for a further year.

Applications, giving age, qualifications, present and previous appointments with dates, together with names and addresses of 3 referees, should be sent to the Secretary, Sheffield Regional Hospital Board, Fulwood House, Old Fulwood-road, Sheffield, 10, to arrive not later than 23rd February, 1953.

LINCOLN COUNTY HOSPITAL. (200 Beds.) Applications are invited for an approved pre-registration post in Medicine at the above Hospital, vacant immediately.

Apply with full particulars to—
R. W. HOWICK, Group Secretary,
Lincoln No. 1 Hospital Management Committee.

LINCOLN. ST. GEORGE'S HOSPITAL, Long Leys-road. (150 Beds.) LINCOLN NO. 1 HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT MEDICAL OFFICER (Junior Hospital Medical Officer grade), at the above Hospital, vacant 10th March, 1953. Married quarters are available.

Applications, stating age, qualifications and experience, together with copies of 3 recent testimonials, should be forwarded to the undersigned as soon as possible.

R. W. HOWICK, Group Secretary.
County Hospital, Lincoln.

LEICESTER GENERAL HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER (anæsthetics), vacant 1st April, 1953. Recognised for D.A.

Applications, stating age, qualifications and experience, together with copies of recent testimonials, to reach the Secretary, Leicester No. 1 Hospital Management Committee, 38A, East Bond-street, Leicester, not later than 19th February, 1953.

LEICESTER GENERAL HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER (pathology), vacant 1st April, 1953.

Applications, stating age, qualifications and experience, together with copies of recent testimonials, to reach the Secretary, Leicester No. 1 Hospital Management Committee, 38A, East Bond-street, Leicester, before 19th February, 1953.

LEICESTER GENERAL HOSPITAL. Applications are invited for the posts of HOUSE PHYSICIANS (3) vacant 1st April, 1953. These posts are recognised for pre-registration.

Applications, stating age, qualifications, and experience, together with copies of recent testimonials, to reach the Secretary, Leicester No. 1 Hospital Management Committee, 38A, East Bond-street, Leicester, not later than 19th February, 1953.

LEICESTER GENERAL HOSPITAL. Applications are invited for the post of PÆDIATRIC HOUSE PHYSICIAN, vacant 1st April, 1953. The post is recognised for pre-registration and is recognised for the D.C.H.

Applications, stating age, qualifications, and experience, together with copies of recent testimonials, to reach the Secretary, Leicester No. 1 Hospital Management Committee, 38A, East Bond-street, Leicester, not later than 19th February, 1953.

LEICESTER GENERAL HOSPITAL. Applications are invited for the post of HOUSE SURGEON, vacant 1st April, 1953. The post is recognised for pre-registration.

Applications, stating age, qualifications, and experience, together with copies of recent testimonials, to reach the Secretary, Leicester No. 1 Hospital Management Committee, 38A, East Bond-street, Leicester, not later than 19th February, 1953.

LEICESTER GENERAL HOSPITAL. Applications are invited for the post of OBSTETRIC AND GYNÆCOLOGICAL HOUSE SURGEON, vacant 1st April, 1953. The post is recognised for pre-registration and is recognised for the M.R.C.O.G.

Applications, stating age, qualifications, and experience, together with copies of recent testimonials, to reach the Secretary, Leicester No. 1 Hospital Management Committee, 38A, East Bond-street, not later than 19th February, 1953.

LEICESTER ROYAL INFIRMARY. Leicester Regional CENTRE FOR RADIOTHERAPY. Applications are invited for the resident post of SENIOR HOUSE OFFICER (radiotherapy) or REGISTRAR if in possession of Part I of the D.M.R.T., now vacant.

Candidates should state age, nationality, qualifications and submit copies of 3 recent testimonials, to Secretary, Leicester No. 1 Hospital Management Committee, 38A, East Bond-street, Leicester.

LEICESTER ROYAL INFIRMARY. Sheffield Regional HOSPITAL BOARD. Applications are invited from registered medical practitioners for the non-resident whole-time post of REGISTRAR (ophthalmology) to the above Hospital. The appointment is for 1 year in the first instance and may be renewed for a further year.

Applications, giving age, nationality, qualifications, present and previous appointments with dates, together with names and addresses of 3 referees, should be sent to the Secretary, Sheffield Regional Hospital Board, Fulwood House, Old Fulwood-road, Sheffield, 10, to arrive not later than 23rd February, 1953.

LEICESTER ROYAL INFIRMARY. Applications are invited for the posts of HOUSE SURGEONS (3), vacant 1st April, 1953. These posts are recognised for pre-registration and are recognised for the F.R.C.S.

Applications, stating age, qualifications, and experience, together with copies of 2 recent testimonials, to reach the Secretary, Leicester No. 1 Hospital Management Committee, 38A, East Bond-street, Leicester, not later than 19th February, 1953.

LEICESTER ROYAL INFIRMARY. Applications are invited for the posts of HOUSE PHYSICIANS (2), vacant 1st April, 1953. These posts are recognised for pre-registration.

Applications, stating age, qualifications, and experience, together with copies of 2 recent testimonials, to reach the Secretary, Leicester No. 1 Hospital Management Committee, 38A, East Bond-street, Leicester, not later than 19th February, 1953.

LEICESTER ROYAL INFIRMARY. Applications are invited for 2 posts of SENIOR HOUSE OFFICER (anæsthetics), vacant 1st April. Posts are recognised for the D.A.

Applications, stating age, qualifications, and experience, together with copies of 3 recent testimonials, to reach the Secretary, Leicester No. 1 Hospital Management Committee, 38A, East Bond-street, Leicester, not later than 19th February, 1953.

LEICESTER ROYAL INFIRMARY. Applications are invited for the post of SENIOR HOUSE OFFICER (Casualty Department), immediate vacancy. The post gives opportunity for study for Final examination for Fellowship.

Applications, with copies of 3 testimonials, forthwith, to Secretary, Leicester No. 1 Hospital Management Committee, 38A, East Bond-street, Leicester.

LEICESTER ROYAL INFIRMARY MATERNITY HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER (obstetrics) commencing 1st April, 1953. Recognised for the D.Obst.R.C.O.G.

Applications, stating age, experience, and qualifications, together with copies of recent testimonials, to reach the Secretary, Leicester No. 1 Hospital Management Committee, 38A, East Bond-street, Leicester, not later than 19th February, 1953.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (135 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of HOUSE SURGEON. Post vacant March, 1953. Salary at the rate of £350 a year; a deduction at the rate of £100 a year is made in respect of board and lodging and other services provided.

Applications should be forwarded as soon as possible to the Administrative Officer at the Hospital.

MAIDSTONE. WEST KENT GENERAL HOSPITAL. (135 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following appointments:—

(*a*) SENIOR HOUSE SURGEON. Post recognised for the F.R.C.S. (Eng.).

(*b*) RECEIVING-ROOM OFFICER.

Salary in each appointment will be £670 a year with deduction of £150 a year for residential emoluments.

Applications to the Administrative Officer at the Hospital as soon as possible.

MALVERN, WORCS. ST. WULSTAN'S HOSPITAL. SOUTH WORCESTERSHIRE HOSPITAL MANAGEMENT COMMITTEE. RESIDENT MEDICAL OFFICER (Junior Hospital Medical Officer) required. The post offers good experience in modern treatment of pulmonary tuberculosis and in all forms of major and minor surgery. Some previous experience in the specialty, either surgical or medical, is necessary. National Health Service conditions of service.

Applications to the Physician-Superintendent, St. Wulstan's Hospital.

MANCHESTER BABIES' AND CHILDREN'S HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (pathology) required to assist the Director of Pathology for the Group, which comprises Booth Hall Children's Hospital, Duchess of York Hospital for Babies, and Monsall Isolation Hospital. The main laboratory is at Booth Hall Hospital. Salary £670 p.a., less £155 p.a. if resident. Post tenable for 1 year in the first instance.

Applications to be sent as soon as possible to the Group Secretary, Booth Hall Hospital, Manchester, 9.

MANCHESTER. SOUTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the resident post of SENIOR HOUSE OFFICER (anæsthetics). The successful candidate will have the opportunity of experience at the various Units within the group.

Applications, stating age, qualifications, present post, experience, and names of 2 referees, to be forwarded to the undersigned immediately. A. H. KEATES, Secretary to the Committee. Withington Hospital, Manchester, 20.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the post of NON-RESIDENT SENIOR REGISTRAR in Psychiatry, with inpatient and outpatient duties in the Psychiatric Department of Crumpsall (General) Hospital, Manchester (1200 Beds), and inpatient duties at the adjacent Springfield (Mental) Hospital, Manchester (800 Beds). This post provides excellent training in all branches of psychiatry. Springfield Hospital is associated with the University Department of Psychiatry and arrangements can be made in due course for the appointee to gain experience in child psychiatry. Previous experience and a higher qualification desirable.

Forms of application may be obtained from the Senior Administrative Medical Officer, Manchester Regional Hospital Board, Cheetwood-road, Manchester, 8, and should be returned, with the names of 3 referees, to be received by 4th March, 1953.

MANCHESTER. WEST MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the following posts which are now vacant:—

Park Hospital, Davyhulme (General Hospital—426 Beds)
SENIOR HOUSE OFFICER (non-tuberculous thoracic surgery) for Manchester Regional Hospital Board Centre.
HOUSE OFFICER (general surgery) with some duties in E.N.T. work.

Vacancies occur periodically in the various departments at Park Hospital and House Officers are eligible for appointment to another specialty at the end of the original term of service when such vacancies occur.

Eccles and Patricroft Hospital (General Hospital—72 Beds)
HOUSE OFFICER.

The work of the Hospital is mainly surgical and there is a busy Outpatient Department.

Salaries for House Officer posts £350–£450 p.a., according to experience, plus £50 p.a. for the post at Eccles and Patricroft Hospital. £100 p.a. deduction for residential accommodation and services. 6 months appointments.

The Senior House Officer appointment will be for 12 months at a salary of £670 p.a., less £155 p.a. for residential accommodation and services.

Application forms from the Secretary, Park Hospital, Davyhulme, Manchester.

MEXBOROUGH. MONTAGU HOSPITAL. Sheffield REGIONAL HOSPITAL BOARD. Applications are invited from registered medical practitioners for the resident whole-time post of SURGICAL REGISTRAR to the above Hospital. The appointment is for 1 year in the first instance and may be renewed for a further year.

Applications, giving age, qualifications, present and previous appointments with dates, together with names and addresses of 3 referees, should be sent to the Secretary, Sheffield Regional Hospital Board, Fulwood House, Old Fulwood-road, Sheffield, 10, to arrive not later than 23rd February, 1953.

MERTHYR GENERAL HOSPITAL. (120 Beds.) Merthyr AND ABERDARE HOSPITAL MANAGEMENT COMMITTEE. RESIDENT SURGICAL OFFICER. The post offers a very good all-round experience in general surgery. Salary £670 p.a., less £100 p.a. for board, lodging, &c. Applicants must have been registered not less than 1 year as a medical practitioner and have previously held house appointments. Appointment for 1 year in the first instance.

Applications, with names of 2 referees, to the Secretary, Merthyr and Aberdare Hospital Management Committee, St. Tydfil's Hospital, Merthyr Tydfil, as soon as possible.

NEWCASTLE GENERAL HOSPITAL. (862 Beds.) NEWCASTLE UPON TYNE HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (Casualty Department). The above resident (or non-resident) post, tenable for 6 or 12 months, becomes vacant immediately.

Applications, with 1 copy of 2 testimonials, should be sent to the Secretary, Newcastle General Hospital, Westgate-road, Newcastle upon Tyne, 4, as soon as possible.

NEWCASTLE REGIONAL HOSPITAL BOARD. Regional CHEST SURGERY CENTRE (160 Beds), SHOTLEY BRIDGE HOSPITAL, AND ASSOCIATED SANATORIA. ANÆSTHETIST (Senior Registrar status), whole-time. Salary scale over a 4-year period £1000–£1300. Appointment up to 31st August, 1954, in the first instance. The great bulk of the work in the main centre—i.e., excluding the sanatoria, is concerned with non-tuberculous conditions (mediastinal, œsophageal, cardiovascular as well as pulmonary). Candidates must possess a D.A., have had considerable experience with anæsthesia, and preferably have had a sound preliminary general medical and/or physiological training. Appointee must be prepared to take an active part in clinical and physiological investigations, preoperative and postoperative management of patients in addition to undertaking the customary duties of an Anæsthetist. The allocation of these duties may have to be varied from time to time according to clinical requirements by arrangement with the Senior Anæsthetist, but usually the work will be divided between the Centre and the Sanatoria. Candidates are entitled to visit the hospitals by arrangement with the Senior Surgeon, Regional Chest Surgery Centre, Shotley Bridge Hospital.

Applications, together with names and addresses of referees (preferably), or testimonials to a total of 3, to be sent to the Senior Administrative Medical Officer, Newcastle Regional Hospital Board, "Blythswood South," Osborne-road, Newcastle upon Tyne, 2, within 21 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. Newcastle GENERAL HOSPITAL (868 Beds), NEUROLOGICAL DEPARTMENT (80 Beds). SENIOR REGISTRAR (whole-time). Tenure for 1 year while holder abroad as a travelling scholar. Salary according to national terms and conditions. Further particulars obtainable from the Senior Neuro-Surgeon.

Applications, together with names and addresses of referees (preferably), or testimonials to a total of 3, to be sent to the Senior Administrative Medical Officer, "Blythswood South," Osborne-road, Newcastle upon Tyne, 2, within 14 days.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Applications are invited for the whole-time non-resident appointment of REGISTRAR in the Department of Radiotherapy. The possession of the D.M.R. or D.M.R.T. is an advantage but not essential for this appointment.

Applications, giving age, nationality, experience and qualifications, with the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the date of appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.
Royal Victoria Infirmary, Newcastle upon Tyne.

NORWICH. NORFOLK AND NORWICH HOSPITAL. (440 Beds.) Applications are invited for the appointment of HOUSE SURGEON to the Orthopædic Department. Salary £350–£450 according to experience, less £100 p.a. for residence, &c. 6 months appointment.

Applications, stating age, qualifications, experience, with names of 2 referees to Secretary, Group 6 Hospital Management Committee, St. Stephen's-road, Norwich.

NORWICH. NORFOLK AND NORWICH HOSPITAL. Applications are invited for the post of HOUSE SURGEON (Male or Female) at the West Norwich Hospital, Bowthorpe-road, Norwich. Recognised for Final F.R.C.S. examination requirements. The beds at this Hospital are under the control of the Consultant staff of the Norfolk and Norwich Hospital. Salary £350, £400 or £450 according to experience; deduction for residence.

Applications, stating age, qualifications and experience, with names of 2 referees, to Secretary, Group 6 Hospital Management Committee, St. Stephen's-road, Norwich.

NORWICH. NORFOLK AND NORWICH HOSPITAL. PÆDIATRIC DEPARTMENT AT THE JENNY LIND HOSPITAL FOR CHILDREN. Applications are invited for the appointment of HOUSE SURGEON (Male or Female) in the Surgical Section of the Jenny Lind Hospital, which forms the entire Paediatric Department of the United Norwich Hospitals. The post is recognised under the Medical Act, 1950, for pre-registration service. The duties are under the direct supervision of the Consultant staff of the Norfolk and Norwich Hospital. Salary £350, £400 or £450, less £100 p.a. for residential emoluments.

Applications, stating age, qualifications and experience, with names of 2 referees, to Secretary, Norwich, Lowestoft and Gt. Yarmouth (Group 6) Hospital Management Committee, St. Stephen's-road, Norwich.

NORTH AND MID-CHESHIRE HOSPITAL MANAGEMENT COMMITTEE. Required, GROUP SENIOR HOUSE OFFICER (Anæsthetist) non-resident, to commence duties as soon as possible. Salary £670 p.a. Post recognised for D.A. qualification. This appointment in busy hospitals staffed by Manchester Consultants offers excellent opportunities of practical experience to suitably qualified candidates. The work will be principally at Altrincham General Hospital (130 Beds), and St. Anne's E.N.T. Hospital (53 Beds), but successful candidate will be expected to work at any other hospital in the Group.

Forms of application may be obtained from the Group Secretary, North and Mid-Cheshire Hospital Management Committee, Sinderland-road, Altrincham, Cheshire, and should be returned with copies of 2 recent testimonials.

NOTTINGHAM. CITY HOSPITAL. (837 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER to the Department of Thoracic Surgery. Post vacant 15th March, 1953. Salary £670 p.a., less £130 p.a. for residential emoluments. The appointment will be for 1 year.

Applications, stating age, nationality, qualifications, and experience, together with copies of not more than 3 testimonials, to be submitted immediately to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. Applications are invited from registered medical practitioners (Male or Female) for the post of RESIDENT SENIOR ANÆSTHETIC HOUSE OFFICER; duties to commence on or about 1st March, 1953. Terms and conditions of service in accordance with the published regulations of the Ministry of Health. £150 deducted for residential emoluments.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the undersigned as soon as possible. HENRY M. STANLEY, Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. Applications are invited from registered medical practitioners for the post of RESIDENT SENIOR HOUSE OFFICER for the Casualty Department. Salary (less £150 emoluments) and conditions of service in accordance with those laid down by the Ministry; duties to commence as soon as possible.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to—
General Hospital, Nottingham. HENRY M. STANLEY.

NOTTINGHAM. NEWARK HOSPITAL. Sheffield REGIONAL HOSPITAL BOARD. Applications are invited from registered medical practitioners for the resident whole-time post of SURGICAL REGISTRAR to the above Hospital. The appointment is for 1 year in the first instance, and may be renewed for a further year.

Applications, giving age, qualifications, present and previous appointments with dates, together with names and addresses of 3 referees, should be sent to the Secretary, Sheffield Regional Hospital Board, Fulwood House, Old Fulwood-road, Sheffield, 10, to arrive not later than 23rd February, 1953.

NUNEATON. GEORGE ELIOT HOSPITAL. (289 Beds.) PÆDIATRIC HOUSE PHYSICIAN required (35 Beds). Post recognised for D.C.H. and includes supervision of babies in Maternity Ward. Approved as pre-registration appointment.

Applications to the Medical Superintendent.

OXFORD. RADCLIFFE INFIRMARY. Senior Dental REGISTRAR (resident), locum, from 9th to 29th March, 1953, inclusive. Experience in jaw fractures.

Apply, stating age, experience and qualifications, together with names of 2 referees, to Administrator.

OXFORD REGIONAL HOSPITAL BOARD. Applications are invited for the post of REGISTRAR in Dental Surgery to the hospitals of the Aylesbury Area based on the Plastic and Dental Surgery Unit of the Stoke Mandeville Hospital. The appointment will be for 1 year and eligible for extension to a second year.

Applications on forms obtainable from the Secretary, Registrar Committee, 43, Banbury-road, Oxford, should reach him by 28th February.

OXFORD REGIONAL HOSPITAL BOARD. Applications are invited from registered medical practitioners for the post of REGISTRAR in General Surgery to the Swindon Group of Hospitals. The Group has 69 surgical beds and deals with all types of general surgery. The post is recognised for the F.R.C.S.

Applications on forms obtainable from the Secretary, Registrar Committee, 43, Banbury-road, Oxford, should reach him by 28th February.

OXFORD. UNITED OXFORD HOSPITALS. Applications are invited from registered medical practitioners for the post of REGISTRAR in General Medicine to the United Oxford Hospitals. A higher medical qualification is desirable. The appointment will be for 1 year and eligible for extension to 2 years.

Applications on forms obtainable from the Secretary, Registrar Committee, 43, Banbury-road, Oxford, should reach him by 26th February.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL. Applications are invited from registered medical practitioners for the appointments of :—

(1) SENIOR HOUSE OFFICER to the E.N.T. Department of the Plymouth Hospitals, vacant immediately.
(2) SENIOR HOUSE OFFICER in Surgery, Greenbank Road Section, vacant 13th March, 1953, recognised for the Fellowship of the Royal College of Surgeons.
(3) RESIDENT ANÆSTHETIST, Greenbank Road Section, vacant immediately, recognised for the D.A.
(4) HOUSE SURGEONS, Greenbank Road Section, vacancies 13th March, 8th and 20th April, 1953, recognised for the Fellowship of the Royal College of Surgeons.
(5) SENIOR HOUSE OFFICER in Anæsthetics, Freedom Fields Section, vacant immediately.
(6) PÆDIATRIC HOUSE PHYSICIAN, Freedom Fields Section, vacant 6th April, 1953, recognised for the D.C.H.
(7) HOUSE SURGEON, Freedom Fields Section, vacant 22nd February, 1953, recognised for the Fellowship of the Royal College of Surgeons.
(8) HOUSE SURGEON in Obstetrics and Gynæcology, Alexandra Maternity Home, Devonport, vacant 14th May, 1953.

Applications, stating age, nationality, qualifications and experience with the names of 3 referees, to be sent to the undersigned as soon as possible.

ARTHUR R. CASH, Group Secretary.
7, Nelson-gardens, Devonport.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL, Greenbank Road. Applications invited from duly qualified and registered medical practitioners for the appointment of SENIOR HOUSE OFFICER to Casualty and Fracture Department, vacant 1st March, 1953. The appointment will be for a period of 12 months. Salary at £670 p.a.

Applications, stating age, nationality, qualifications, and experience, together with the names of 3 referees, to be sent to—
ARTHUR R. CASH, Group Secretary.
7, Nelson-gardens, Devonport.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL. DEPARTMENT OF OBSTETRICS AND GYNÆCOLOGY. Applications invited from registered medical practitioners for the appointments of :—

(1) HOUSE SURGEON (second or third post), vacant 1st May, 1953.
(2) HOUSE SURGEON (second or third post), vacant 14th May, 1953.

Recognised for the Membership of the Royal College of Obstetricians and Gynæcologists. Wide experience can be obtained in obstetrics, including antenatal and postnatal clinics.

Applications, stating age, nationality, qualifications and experience, together with 3 recent testimonials, should be sent to ARTHUR R. CASH, Group Secretary.
7, Nelson-gardens, Devonport.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL. DEPARTMENT OF OBSTETRICS AND GYNÆCOLOGY. Applications invited from duly qualified and registered medical practitioners for the appointment of RESIDENT OBSTETRICAL OFFICER (Senior House Officer grade), vacant 1st April, 1953. There will be additional duties at the Flete Maternity Home and the Alexandra Maternity Home, which are parts of the Department. Candidates should have had considerable experience in a department of obstetrics and gynæcology. The appointment will be for a period of 12 months and is renewable. Salary £670 p.a. Terms and conditions of service are in accordance with the National Health Service terms. The post is recognised by the Royal College of Obstetricians and Gynæcologists for the Membership examination of the College.

Applications, stating age, nationality, qualifications and experience, together with the names and addresses of 3 referees, should be sent to—
ARTHUR R. CASH, Group Secretary, Plymouth,
South Devon and East Cornwall General Hospital Group.
7, Nelson-gardens, Devonport.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE. SAINT MARY'S HOSPITAL. (773 Beds.) Applications are invited for the appointment of SENIOR HOUSE OFFICER (Casualty and Orthopædic Department).

Applications, stating age, experience, and qualifications, and names of 2 referees, should be submitted as soon as possible to—
35, Grove-road South, Southsea. E. H. HURST.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following appointment :—

Saint Mary's Hospital (773 Beds)

PÆDIATRIC HOUSE PHYSICIAN, now vacant. There is a Pædiatric Unit of 53 Beds, together with responsibility for 60 neonatal cots, and the post is recognised for candidates preparing for the D.C.H.

Applications, stating age, experience, and qualifications, and names of 2 referees, should be submitted as soon as possible to E. H. HURST.

35, Grove-road South, Southsea.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following appointments :—

Saint Mary's Hospital (74 acute medical beds)

HOUSE PHYSICIAN, vacant 1st March, 1953.

Queen Alexandra Hospital (124 surgical beds)

HOUSE SURGEON, vacant 15th March, 1953.

Applications, stating age, experience and qualifications, and names of 2 referees, should be submitted as soon as possible to—

35, Grove-road South, Southsea. E. H. HURST.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following appointments :—

Royal Portsmouth Hospital (70 surgical beds)

HOUSE SURGEON, vacant now.

Chest Services (160 Beds)

HOUSE PHYSICIAN, vacant now.

Applications, stating age, experience, and qualifications, and names of 2 referees, should be submitted as soon as possible to—

35, Grove-road South, Southsea. E. H. HURST.

PENZANCE. WEST CORNWALL HOSPITAL. (General —100 Beds.) WEST CORNWALL HOSPITAL MANAGEMENT COMMITTEE. **Applications are invited from registered medical practitioners for the post of CASUALTY HOUSE SURGEON. Post now vacant.**

Applications, stating age, nationality, qualifications, and experience, and enclosing copies of 2 recent testimonials, should be forwarded to the Hospital Secretary, West Cornwall Hospital, Penzance.

PONTYPRIDD (near). EAST GLAMORGAN HOSPITAL, CHURCH VILLAGE. (316 Beds. Committee's Base Hospital serving population of 177,000. Recognised for the D.Obst.R.C.O.G., D.C.H., and D.A.) PONTYPRIDD AND RHONDDA HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (surgical).

Applications, stating age, qualifications, and experience, together with copies of 2 recent testimonials, to be sent as soon as possible to the Group Secretary, Pontypridd and Rhondda Hospital Management Committee, Courthouse-street, Pontypridd.

POOLE GENERAL HOSPITAL, Poole, Dorset. BourneMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required immediately. The Hospital is recognised for the F.R.C.S. and F.R.C.S.E.

Applications to the Hospital Secretary of the Hospital.

RAMSGATE. THE GENERAL HOSPITAL. (101 Beds.) Applications are invited for the post of HOUSE SURGEON, which will be for 6 months and is recognised for the D.A. Salary at the rate of £350–£450 p.a., according to experience, less £100 for residential emoluments.

Applications, stating age, and qualifications, together with copies of 2 recent testimonials, should be sent as soon as possible to the Hospital Secretary.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) Applications are invited from registered medical practitioners for the post of HOUSE SURGEON (resident) in the General Surgical Unit vacant from 1st March, 1953. 6 months appointment. This very active General Surgical Unit of approximately 100 Beds affords ample opportunity for candidates to obtain first-class tuition and experience. Appointment recognised for F.R.C.S. examination.

Applications, stating age, nationality, qualifications with dates, and details of experience, together with copies of 2 recent testimonials or names of 2 referees, should be sent immediately to the Group Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) Applications are invited from registered medical practitioners for the post of HOUSE PHYSICIAN (neurosurgery), vacant from 25th February, 1953. Resident post, tenable for 6 months. Would be suitable for candidate seeking a higher qualification as it offers excellent experience in neurology.

Applications, stating age, nationality, qualifications with dates, and experience, together with copies of 2 recent testimonials or names of 2 referees, should be sent immediately to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROMFORD, ESSEX. VICTORIA HOSPITAL. (81 Beds.) Applications are invited from registered medical practitioners (Male) for the post of RESIDENT HOUSE SURGEON, vacant from 6th March, 1953. 6 months appointment.

Applications, stating age, nationality, qualifications with dates, and experience, together with copies of 2 recent testimonials or names of 2 referees, should be sent immediately to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROMFORD, ESSEX. RUSH GREEN HOSPITAL. (247 Beds.) Applications are invited from registered medical practitioners (Male) for the post of RESIDENT HOUSE OFFICER (general surgery) at the above Hospital. 6 months appointment. Post is recognised for pre-registration purposes and for F.R.C.S.

Applications, stating age, nationality, qualifications with dates, and experience, together with copies of 2 recent testimonials or names of 2 referees, should be addressed immediately to the Medical Superintendent.

READING AREA HOSPITALS. Applications are invited for the post of SENIOR HOUSE OFFICER (pathology), vacant immediately. Deduction, if resident, £100. Previous experience in pathology desirable but not essential.

Apply, stating age, qualifications with dates, nationality, present post, together with copies of recent testimonials, to Group Secretary, 3, Craven-road, Reading.

RHONDDA. PORTH AND DISTRICT HOSPITAL. (110 Beds. This Hospital is visited regularly by Consultants from the Cardiff Royal Infirmary.) PONTYPRIDD AND RHONDDA HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE OFFICER (surgical and casualty).

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to be sent as soon as possible to the Group Secretary, Pontypridd and Rhondda Hospital Management Committee, Courthouse-street, Pontypridd.

RUGBY. HOSPITAL OF ST. CROSS AND ST. MARY'S HOSPITAL. HOUSE SURGEON for Obstetric (50 Beds) and Gynæcological (12 Beds) Departments. Required 1st March.

Applications, with copy testimonials, to Hospital Secretary, Hospital of St. Cross, Rugby.

RUGBY. HOSPITAL OF ST. CROSS. House Physician required 22nd March for Adult Medical Unit and Children's Ward. Pre-registration post.

Applications, with copy testimonials, to Hospital Secretary.

SALISBURY GENERAL HOSPITAL. Salisbury Group HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT SENIOR HOUSE OFFICER to the E.N.T. Department. The Department has 42 Beds and is recognised for the D.L.O. and F.R.C.S. Post vacant 1st March, 1953.

Apply, as soon as possible, naming 2 referees, to Group Secretary, Odstock Hospital, Salisbury.

SALISBURY GENERAL HOSPITAL. Salisbury Group HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT HOUSE SURGEON or SENIOR HOUSE OFFICER to the Orthopædic Department. Post vacant 1st March, 1953, and is graded according to experience.

Apply immediately, naming 2 referees, to Group Secretary, Odstock Hospital, Salisbury.

SALISBURY GENERAL HOSPITAL. Applications are invited for the appointment of RESIDENT HOUSE SURGEON for a period of 6 months from 28th February, 1953.

Apply, naming 2 referees, to Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury.

SALISBURY. PLASTIC AND ORAL SURGERY CENTRE, ODSTOCK HOSPITAL. SALISBURY GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (surgical). The post is now vacant and tenable for 1 year. Experience can be gained in the plastic aspects of general surgery, maxillo-facial surgery and burns. Applicants should have held previous house appointments. Salary £670 p.a.

Apply, giving names of 2 referees, to Group Secretary, Odstock Hospital, Salisbury, Wilts.

SCARBOROUGH HOSPITAL. (190 Beds.) Scarborough, BRIDLINGTON, MALTON AND WHITBY GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, SENIOR HOUSE OFFICER (surgical), to commence duty approximately mid-May. Terms and conditions of service in accordance with those prescribed for medical and dental staffs. The post which is recognised by the Royal College of Surgeons for the F.R.C.S., will be for a period of 1 year. The position will be non-resident and a flat is available near to the Hospital if required.

Applications, giving age, qualifications, details of present and previous appointments with dates, and the names of 3 referees, should be forwarded to the Secretary of the Hospital, Scalby-road, Scarborough.

SCOTLAND NORTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the post of SENIOR REGISTRAR in Dermatology on the staffs of the Aberdeen General Hospitals and Aberdeen Special Hospitals. Salary and terms and conditions of appointment are as laid down for hospital medical and dental staffs (Scotland).

Applications, together with the names of 2 referees, should be lodged by 7th March, 1953, with the Secretary, 1, Albyn-place, Aberdeen, from whom further particulars of the appointment can be obtained.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of a REGISTRAR (resident) in Obstetrics and Gynæcology at the Edinburgh Northern Group of hospitals, based on the Eastern General Hospital. The post is superannuable and the conditions of service are in accordance with the regulations.

Applications, giving particulars of age, previous experience and qualifications, together with the names of 2 referees, should be submitted to the Secretary, South-Eastern Regional Hospital Board, 11, Drumsheugh-gardens, Edinburgh, 3, within 30 days.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited from suitably qualified medical practitioners for the following appointments, which will be for 1 year in the first instance :—

SENIOR REGISTRAR in Surgery at the Southern General Hospital, Glasgow.

REGISTRAR in Pathology based at Glasgow Royal Infirmary.

REGISTRAR in Medicine including duties in Neurology at the Western Infirmary, Glasgow and Killearn Hospital.

The above appointments will be subject to the National Health Service (Scotland) superannuation regulations.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment and giving the names of 3 referees, should be submitted not later than 1st March, 1953, to the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited from suitably qualified medical practitioners for the following appointments, which will be for 1 year in the first instance :—

(*a*) SENIOR HOUSE OFFICER in Psychiatry at Stobhill Hospital, Glasgow.
(*b*) SENIOR HOUSE OFFICER in Tuberculosis at Ruchill Hospital, Glasgow.
(*c*) SENIOR HOUSE OFFICER in Obstetrics and Gynæcology at Western District Hospital, Glasgow.

Applications, stating age, qualifications, experience, and present appointment, and giving the names of 3 referees, should be submitted not later than 21st February, 1953, to the Secretary, Board of Management for Glasgow Northern Hospitals, 13, Woodside-place, Glasgow, C.3.

SHEFFIELD. CITY GENERAL HOSPITAL. (Recognised for F.R.C.S. England.) Applications are invited for the resident appointment of HOUSE SURGEON (general surgery—recognised pre-registration post), vacant 1st April, 1953.

Applications, giving full details of age, nationality, qualifications, present and previous appointments with dates, and the names of 2 persons to whom reference may be made, should be forwarded to W. STANSFIELD at Nether Edge Hospital, Sheffield, 11, not later than 20th February, 1953.

SHEFFIELD. CITY GENERAL HOSPITAL. Applications are invited for the post of RESIDENT HOUSE PHYSICIAN (recognised pre-registration post) at the above Hospital and Fir Vale Infirmary, vacant 1st April, 1953. Acute medical cases are admitted to the City General Hospital and geriatric experience is provided at Fir Vale Infirmary. The appointment will give special opportunity for the study of diseases of the chest. Undergraduate and postgraduate teaching is undertaken in the Medical Department.

Applications, giving full details of age, qualifications, and experience with dates, and the names of 2 persons to whom reference may be made, should be forwarded to the undersigned at Nether Edge Hospital, Sheffield, 11, not later than 20th February, 1953. W. STANSFIELD, Secretary.

SHEFFIELD. CITY GENERAL HOSPITAL. Group LABORATORY. Applications are invited for the post of SENIOR HOUSE OFFICER in Clinical Pathology. Facilities for all round training in all branches of pathology.

Apply, giving full details of age, qualifications, present and previous appointments with dates, and the names of 2 persons to whom reference may be made, to the undersigned at Nether Edge Hospital, Sheffield, 11.

W. STANSFIELD, Secretary,
Sheffield No. 1 Hospital Management Committee.

SHEFFIELD REGIONAL HOSPITAL BOARD. Regional BLOOD TRANSFUSION SERVICE. A number of registered medical practitioners are required for occasional work with mobile teams from the Sheffield Blood Transfusion Centre at blood-collecting sessions within the Sheffield Regional Hospital Board's Area. Payment for this work is on a sessional basis, **the rate of £1 1s. for an hour or part of an hour with a maximum of £3 3s. per session,** plus mileage allowance where appropriate.

Interested persons residing in the counties of Derbyshire, Leicestershire, Lincolnshire, and Nottinghamshire, should communicate with the Director, Regional Blood Transfusion Service, Northfield-road, Sheffield, 10.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. ROYAL INFIRMARY UNIT. Applications invited from registered medical practitioners for the non-resident or resident post of SENIOR HOUSE OFFICER to the Ophthalmic Department at the above Hospital.

Applications, stating age, qualifications and experience, with the names of 3 referees (or testimonials), should be sent immediately to the Superintendent, Royal Infirmary, Sheffield, 6.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. ROYAL HOSPITAL UNIT. Applications are invited for the non-resident post of REGISTRAR in E.N.T. Surgery at the above Hospital.

Applications, stating age, qualifications and experience, with the names of 3 referees, should be sent immediately to the Chief Administrative Officer, The United Sheffield Hospitals, West-street, Sheffield, 1.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. JESSOP HOSPITAL FOR WOMEN. Vacancies will occur on 1st April, 1953, in the Obstetric and Gynæcological Departments for SENIOR HOUSE OFFICERS (resident). Salary rate £670 p.a.

Applications, stating age, qualifications and experience, together with 3 references, to the Superintendent, Jessop Hospital for Women, Leavygreave-road, Sheffield, 3, immediately.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. ROYAL INFIRMARY UNIT. Applications are invited for the non-resident post of SENIOR REGISTRAR in Neurosurgery at the above Hospital.

Applications, stating age, qualifications and experience, with the names of 3 referees, should be sent by 14th March, 1953, to the Chief Administrative Officer, The United Sheffield Hospitals, West-street, Sheffield, 1.

SOUTHALL, MIDDLESEX. ST. BERNARD'S HOSPITAL FOR NERVOUS AND MENTAL DISORDERS. Application is invited for the post of SENIOR HOUSE OFFICER. Facilities are afforded Junior staff to become versed in all branches of psychiatry. Resident or non-resident. National Health Service salary and conditions.

Applications, giving full details, and copies of 3 recent testimonials, should be sent to the Physician-Superintendent, within 14 days of appearance of this advertisement.

SOUTHAMPTON CHEST HOSPITAL. Resident House OFFICER (Male or Female) required from 26th March for duties partly in the wards for infectious diseases, partly in the Chest Department. Post tenable for 6 months.

Apply as soon as possible with copies of testimonials to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON CHILDREN'S HOSPITAL. (Recognised by Conjoint Board for D.C.H.) HOUSE OFFICER required; post vacant 4th March, 1953. Salary, &c. as nationally advocated. Preference given to candidates intending to specialise in pædiatrics.

Applications, with copies of testimonials, to be submitted not later than 18th February to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON GENERAL HOSPITAL. (80 surgical beds.) HOUSE SURGEON (resident) required immediately. Post recognised for F.R.C.S. and tenable for 6 months.

Applications, with copies of testimonials, should be forwarded as soon as possible to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. (280 Beds—Recognised for F.R.C.S.) HOUSE SURGEON (resident) required immediately. Post tenable 6 months.

Applications, with copies of recent testimonials, should be forwarded as soon as possible to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHEND GENERAL HOSPITAL. Applications are invited for the post of RESIDENT HOUSE SURGEON (House Officer grade) now vacant, for a period of 6 months for general surgical duties, including certain duties in the Orthopædic and Fracture Department.

Applications, stating age, qualifications and experience, with copies of 3 recent testimonials, to reach the undersigned as soon as possible. J. C. FIELD, Secretary,
Southend-on-Sea Hospital Management Committee.

SOUTHEND-ON-SEA GENERAL HOSPITAL. Applications are invited for the position of RESIDENT SENIOR HOUSE OFFICER (medical) for 1 year from 1st April, 1953, for duties in a modern general hospital with a large Outpatient Department.

Applications, stating age, qualifications, nationality, and previous experience, with copies of recent testimonials, should reach the undersigned not later than 25th February, 1953.
J. C. FIELD, Secretary.

SHREWSBURY. ROYAL SALOP INFIRMARY AND COPTHORNE HOSPITAL. (500 Beds.) Applications are invited for the post of RESIDENT ANÆSTHETIST (House Officer grade), vacant immediately. Post recognised for the D.A.

Applications, stating age, nationality, qualifications, and previous hospital appointments, together with copies of recent testimonials, should be sent to—
J. P. MALLETT, Group Secretary,
Shrewsbury Group Hospital Management Committee.
Royal Salop Infirmary, Shrewsbury, 16th December, 1952.

ST. ALBANS CITY HOSPITAL, St. Albans, Herts. (372 Beds.) Locum HOUSE PHYSICIAN (House Officer grade) required at the above Hospital for duties mainly in the Pædiatric Department for the period 27th February–16th March, 1953, inclusive of both dates.

Applications, giving age, qualifications and experience, should be forwarded immediately to the Deputy Group Secretary, St. Albans City Hospital, Normandy-road, St. Albans, Herts.

ST. ALBANS CITY HOSPITAL. (372 Beds.) Applications are invited for the appointment of HOUSE SURGEON (House Officer grade) for 1 of the 2 general surgical teams. (Recognised for the F.R.C.S.) Post vacant 26th March, 1953. Preference will be given to candidates seeking pre-registration posts under the Medical Act, 1950.

Applications, together with the names of 2 referees, should be forwarded to the Deputy Group Secretary, St. Albans City Hospital, Normandy-road, St. Albans, Herts.

ST. HELENS HOSPITAL, Marshalls Cross-road, St. HELENS. (196 Beds.) Applications are invited for the appointment of RESIDENT HOUSE SURGEON. 6 months appointment. Salary in accordance with the terms and conditions of service for medical staff.

Applications, stating age, qualifications and experience, and giving 2 names for reference, should be forwarded to the undersigned as soon as possible.

N. RICHARDS, Secretary,
St. Helens and District Hospital Management Committee.
Group Office, County Hospital, Whiston, near Prescot, Lancs.

STAFFORD. STAFFORDSHIRE GENERAL INFIRMARY. (159 Beds—Recovery Unit 32 Beds.) STAFFORD HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE SURGEON (Male or Female), vacant 15th March. Post recognised for training for F.R.C.S. Eng., and for pre-registration service.

Applications, giving full particulars, together with copies of 3 recent testimonials, should be forwarded to—
H. H. JONES, Group Secretary.
13, Foregate-street, Stafford.

STAFFORD. STANDON HALL ORTHOPÆDIC HOSPITAL, near ECCLESHALL, STAFFORD. Applications are invited from suitably qualified medical practitioners (Male or Female) for the post of SENIOR HOUSE OFFICER (orthopædics). Salary £670 p.a., less deduction for residential emoluments.

Applications, stating age, qualifications, and experience, together with copies of 3 recent testimonials, should be forwarded to— H. H. JONES, Group Secretary,
Stafford Hospital Management Committee.
13, Foregate-street, Stafford.

STOKE-ON-TRENT. BUCKNALL ISOLATION HOSPITAL. STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (medical).

Apply, with copy testimonials, stating age, nationality, and full details of previous service, to the Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL, STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE OFFICER (medical), now vacant. Post recognised for experience during pre-registration period.

Apply, with copy testimonials, stating age, nationality and full details of previous service, to the Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. (938 Beds.) STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the posts of SENIOR HOUSE OFFICER (surgical). 2 posts are available if no applicants are forthcoming for pre-registration appointments. The posts are recognised for F.R.C.S. examination.

Applications, giving details of previous appointments held, together with copies of recent testimonials, should be forwarded forthwith to the Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. (938 Beds.) STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the posts of HOUSE SURGEON (pre-registration), 3 posts. Vacant now.

Applications, with copy testimonials, to be forwarded to the Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE OFFICER (general surgery), vacant 1st March, 1953. The Hospital is recognised for F.R.C.S. examination and the post is recognised for experience during pre-registration period.

Apply, with copy testimonials, stating age, nationality, and full details of previous services, to the Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFS ROYAL INFIRMARY. (475 Beds.) STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE OFFICER (gynæcology), vacant 31st March, 1953. The post is recognised for pre-registration experience and also for the M.R.C.O.G. (Gynæcology only) examination.

Applications, with copy testimonials, and details of previous service, &c., to the Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOCKPORT AND BUXTON HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (anæsthetics) to the above Group. The post, which is recognised for the D.A., will be resident at Stockport Infirmary, Stockport. There is another Senior House Officer (anæsthetics) in the Group.

Applications, stating age, experience, and qualifications, together with copies of 2 testimonials, should be forwarded to the undersigned, immediately. H. G. PRICE, Secretary.

59B, Shaw-heath, Stockport, Cheshire.

STOCKPORT. STEPPING HILL HOSPITAL. (464 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (Assistant Resident Surgical Officer). The post is recognised for the F.R.C.S., and becomes vacant 1st March, 1953.

Applications, stating age, experience and qualifications, together with copies of 2 testimonials, to be forwarded to the undersigned, forthwith.

H. G. PRICE, Secretary,
Stockport and Buxton Hospital Management Committee.
59B, Shaw-heath, Stockport, Cheshire.

STONEHOUSE, GLOS. STANDISH HOUSE SANATORIUM. (278 Beds—Tuberculosis.) JUNIOR HOUSE OFFICER required. Post now vacant.

Applications, stating age, nationality and previous hospital appointments, if any, together with the names of 2 referees, to be sent to the undersigned as soon as possible.

A. BRINSFORD, Secretary.

SULLY HOSPITAL, Sully, Glam. Major Thoracic Centre. (324 Beds.) CARDIFF HOSPITAL MANAGEMENT COMMITTEE. HOUSE OFFICER required immediately. Experience gained in medical and surgical treatment of all chest diseases in adults and children.

Applications to Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

SWANSEA HOSPITAL. (403 Beds.) Glantawe Hospital MANAGEMENT COMMITTEE. Registered medical practitioners are invited to apply for the non-resident appointment of SENIOR HOUSE OFFICER in the Orthopædic Department of Swansea Hospital. The Hospital is recognised for Part II of the Diploma in Physical Medicine.

Applications, stating age, qualifications and experience, should be addressed to—

O. C. HOWELLS, Secretary,
Glantawe Hospital Management Committee.
St. Helen's-road, Swansea.

SWINDON HOSPITAL GROUP. (536 Beds.) Swindon AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications invited from registered medical practitioners for the post of RESIDENT HOUSE SURGEON for General Surgical Unit (80 Beds). Post recognised by Royal College of Surgeons under paragraph 23 of the Fellowship regulations for 6 months of requisite years surgical training.

Applications, giving full details, and names of not more than 3 referees, to Secretary, Swindon and District Hospital Management Committee, 7, Okus-road, Swindon, as soon as possible.

TAUNTON AND SOMERSET HOSPITAL. Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER (casualty and orthopædic).

Applications, stating age, qualifications with dates, nationality, details of experience, together with 2 recent testimonials, to be sent immediately to the Secretary, Taunton Hospital Management Committee, Musgrove Park Hospital, Taunton, Somerset.

TAUNTON HOSPITAL MANAGEMENT COMMITTEE. TAUNTON AND SOMERSET HOSPITAL. Applications are invited for the post of HOUSE SURGEON (general surgery). Post recognised for F.R.C.S.

Applications, stating age, qualifications with dates, and nationality, together with 2 recent testimonials, should be sent immediately to the Secretary, Musgrove Park Hospital, Taunton.

TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. HOUSE PHYSICIAN required for post vacant 2nd March. Preference will be given to persons seeking a pre-registration House Officer post under the Medical Act, 1950. Salary on national scale.

Applications, stating age, experience and qualifications, with dates, together with copies of 2 testimonials, should be sent to the Hospital Secretary immediately.

TRURO. ROYAL CORNWALL INFIRMARY. (212 Beds —8 Residents.) WEST CORNWALL HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the combined pre-registration post of JUNIOR HOUSE PHYSICIAN AND HOUSE SURGEON (E.N.T. and Ophthalmic Departments).

Applications, stating age, qualifications, and experience, with copies of 2 recent testimonials, to the Hospital Secretary.

TUNBRIDGE WELLS GROUP HOSPITAL MANAGE-MENT COMMITTEE. PEMBURY HOSPITAL, PEMBURY. (624 Beds.) Applications invited for post of RESIDENT ANÆSTHETIST (Senior House Officer). Post vacant in February, 1953, tenable for 12 months, recognised for D.A. examination.

Apply Group Secretary, Sherwood Park, Pembury-road, Tunbridge Wells.

TUNSTALL. BURSLEM, HAYWOOD AND TUNSTALL WAR MEMORIAL HOSPITAL. (96 Beds.) STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (general surgery).

Apply, with copy testimonials, stating age, nationality, and full details of previous service, to the Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

TUNSTALL. BURSLEM, HAYWOOD AND TUNSTALL WAR MEMORIAL HOSPITAL. (96 Beds.) STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE OFFICER (medical).

Applications, with copy testimonials, and details of previous appointments held, should be forwarded to the Group Secretary, Stoke-on-Trent Hospital Management Committee, Princes-road, Stoke-on-Trent, as soon as possible.

TUNSTALL. BURSLEM, HAYWOOD AND TUNSTALL WAR MEMORIAL HOSPITAL. (96 Beds.) STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE OFFICER (general surgery).

Apply, with copy testimonials, stating age, nationality, and full details of previous service, to the Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

WARRINGTON GENERAL HOSPITAL. (368 Beds.) Applications are invited from persons experienced in anæsthetics for the post of RESIDENT ANÆSTHETIST (Male or Female), graded as Senior House Officer. The Hospital is recognised for the D.A. examination. Salary is £670 p.a., less a deduction of £130 p.a. for residential emoluments.

Applications, stating qualifications and experience, should be sent to— H. L. BOOT, Group Secretary,
Warrington and District Hospital Management Committee.
c/o General Hospital, Warrington, Lancs.

WELSH REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of a REGISTRAR in Infectious Diseases to serve the Glantawe Hospital Management Committee. The successful candidate will be based at the Hill House Isolation Hospital, Swansea (118 Beds). The post is resident and will be subject to review at the end of the first year.

Forms of application should be obtained from the Senior Administrative Medical Officer, Welsh Regional Hospital Board, Cathays Park, Cardiff, within 14 days of appearance of this advertisement.

WESTCLIFF HOSPITAL, Balmoral-road, Westcliff-on-SEA. Applications are invited for the position of RESIDENT HOUSE MEDICAL OFFICER (House Officer grade) at the Westcliff Hospital, post vacant immediately. The Hospital deals with communicable diseases, general medicine, and tuberculosis. The appointment covers a wide field of medicine and offers excellent training for general practice.

Applications, &c., to be sent to the Secretary at the above Hospital as soon as possible.

J. C. FIELD, Secretary,
Southend-on-Sea Hospital Management Committee.

WESTON-SUPER-MARE GENERAL HOSPITAL. (110 Beds.) Applications are invited from registered medical practitioners for the resident appointments of 2 HOUSE SURGEONS (first, second, or third posts), vacant 1st March, 1953. The appointments will be for a period of 6 months in the first instance and may be renewed for a further 6 months.

Applications, stating age, qualifications, and experience, together with names and addresses of 2 referees, should be addressed to the Secretary, Weston-super-Mare Hospital Management Committee.

WEYMOUTH AND DISTRICT HOSPITAL. (124 Beds.) HOUSE SURGEON required, Male or Female, post now vacant and tenable for 6 months.

Applications, giving details of age, experience, qualifications, and nationality, together with copies of testimonials, to the Group Secretary, West Dorset Group Hospital Management Committee, Damers-road, Dorchester, Dorset, immediately.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOS-PITAL. SENIOR HOUSE OFFICER (orthopædics) required, vacant immediately. Appointment will be for 6 months in the first instance. The post is recognised for the F.R.C.S. Salary £670 p.a., less £150 for board and residence.

Applications, with copies of 2 testimonials, should be sent to the Secretary.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOSPITAL. HOUSE SURGEON (general and E.N.T.), vacant 16th March. May be pre-registration post.

Applications, with copies of 2 testimonials, to the Secretary.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOSPITAL. HOUSE SURGEON (gynæcology) required, vacant 20th March. The Hospital is recognised by the Royal College. May be pre-registration post.

Applications, with copies of 2 testimonials, to the Secretary.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOSPITAL. HOUSE SURGEON (general and E.N.T.), vacant 2nd March. May be pre-registration post.

Applications, with copies of 2 testimonials, should be sent to the Secretary.

WIGAN. ROYAL ALBERT EDWARD INFIRMARY. (225 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (anæsthetics) for duties at the above and other hospitals in the Group. The post which will be vacant on 1st March, 1953, is tenable for 1 year, will be resident, and is recognised for the D.A. examinations. Wide experience in all branches of anæsthesia is available, and there are particular facilities for experience in major thoracic and orthopædic work.

Applications, stating age, experience, and nationality, together with the names of 2 referees, should be forwarded to the undersigned as soon as possible.

T. W. HURST, Secretary,
Wigan and Leigh Hospital Management Committee.
Knowsley House, Wigan.

WORTHING GROUP HOSPITAL MANAGEMENT COMMITTEE. WORTHING HOSPITAL, Lyndhurst-road, WORTHING, SUSSEX. (272 Beds—5 Resident Officers.) Applications are invited from registered medical practitioners for post of HOUSE SURGEON for special departments (new appointment). Accommodation available for male or female staff. R practitioners within 3 months of qualification or holding a first post may apply. Salary £350–£450 according to experience, less £100 p.a. for board, lodging, &c. Appointment subject to conditions of service for the National Health Service.

Apply to Hospital Secretary, Worthing Hospital, stating age, qualifications with dates, nationality, and details of experience, together with copies of 2 recent testimonials.

A. V. OAKTON, Group Secretary.

WREXHAM. MAELOR GENERAL HOSPITAL. (517 Beds.) WREXHAM, POWYS AND MAWDDACH HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for a RESIDENT SENIOR HOUSE OFFICER (pædiatrics) to commence duties as soon as possible. Duties include the care of medical and surgical beds in a Pædiatric Unit (50 Beds and Cubicles) under supervision of the Consultant Pædiatrician, also care of the newborn in the Maternity Unit (25 Beds).

Applicants must have experience in this specialty and should apply, enclosing 2 recent testimonials, to—

WILLIAM JONES, Secretary, Wrexham,
Powys and Mawddach Hospital Management Committee.
Maelor General Hospital, Wrexham.

YORKSHIRE. EAST RIDING HOSPITAL MANAGEMENT COMMITTEE.

Westwood Hospital, Beverley, Yorks

(*a*) SENIOR ORTHOPÆDIC HOUSE SURGEON, vacant now. Recognised for F.R.C.S.

(*b*) RESIDENT PATHOLOGIST (Senior House Officer), in Area Laboratory, with attendance at Branch Laboratory, Driffield. Post vacant shortly. Offers experience all branches pathology.

(*c*) HOUSE SURGEON (first, second, or third post), vacant now. General surgical duties, some orthopædics. Recognised for F.R.C.S.

East Riding General Hospital, Driffield, Yorks

(*d*) HOUSE PHYSICIAN (first, second, or third post), vacant now. Duties include medical and chronic wards, casualty and some anæsthetics and midwifery. Good general experience for first House appointment.

Broadgate (Mental) Hospital, Beverley, Yorks

(*e*) HOUSE PHYSICIAN (first, second, or third post), vacant 1st March, 1953.

Northfield Sanatorium, Driffield, Yorks

(*f*) HOUSE PHYSICIAN (first, second, or third post), vacant now. Sanatorium has 78 Beds for adults.

Salary for (*a*) and (*b*) is £670 p.a. and for (*c*), (*d*), (*e*), and (*f*) is £350–£450 according to previous posts held.

Detailed applications to Secretary, Westwood Hospital, Beverley, Yorks.

YORK A AND TADCASTER HOSPITAL MANAGEMENT COMMITTEE.

Military Hospital (Civilian Wing—60 Beds)

SENIOR HOUSE OFFICER (resident or non-resident), immediately. There are 18 gynæcological beds, 30 general surgical beds, and 12 medical beds. The Hospital is associated with the County Hospital (general hospital of 269 Beds) where relief casualty and emergency work and relief work for House Surgeons may be undertaken and where residence can be provided. Salary £670, less £153 for residence.

County Hospital, City Hospital, and Military Hospital (Civilian Wing), York (General hospitals of 269, 265 and 60 Beds respectively)

SENIOR HOUSE OFFICER in Anæsthetics (resident or non-resident) as from 1st March. Salary £670, residence available at a charge of £153. Previous experience in anæsthetics desirable but not essential.

City Hospital, York (Modern general hospital of 265 Beds with full consultant staff)

2 RESIDENT HOUSE SURGEONS immediately. Posts recognised under F.R.C.S. regulations. Wide experience offered. Salary £350, £400 or £450, less £100 for residence.

Applications, giving age, nationality, experience, qualifications, and names of 2 referees, immediately to Secretary, York A and Tadcaster Hospital Management Committee, Bootham Park, York.

WOLVERHAMPTON HOSPITAL MANAGEMENT COMMITTEE GROUP NO. 16, BIRMINGHAM REGION.

The Royal Hospital, Wolverhampton (an Associated Hospital of the University of Birmingham Medical School)

HOUSE OFFICER (Ear, Throat and Nose Department), vacant now. Salary £450 p.a.

SENIOR HOUSE OFFICER or HOUSE OFFICER (Fracture and Orthopædic Department), vacant now.

HOUSE OFFICER (general surgery), vacant now.

Wolverhampton and Midland Counties Eye Infirmary

HOUSE OFFICER, vacant now. Appointment recognised for F.R.C.S. and D.O. examinations.

New Cross Hospital, Wolverhampton

HOUSE OFFICER (general surgery), vacant now. Pre-registration hospital appointment.

Applications, with copies of 3 recent testimonials, to be sent to W. COCKBURN, Group Secretary.

The Royal Hospital, Wolverhampton.

NORTHERN IRELAND TUBERCULOSIS AUTHORITY. Applications are invited for the post of ASSISTANT MEDICAL OFFICER to undertake B.C.G. vaccination work in No. 4 Area which is comprised of County Londonderry and the northern part of County Antrim. Applicants should have held House appointments and have not less than 2 years experience after registration. The person appointed, who will have his headquarters at Londonderry, will act under the general control and supervision of the Physician in charge of the B.C.G. Service. The remuneration for the post will be £700–£50–£1000 p.a., less a deduction of £140 p.a. if resident.

Forms of application and conditions of appointment may be obtained from the Secretary, Northern Ireland Tuberculosis Authority, 27, Adelaide-street, Belfast, with whom completed applications should be lodged not later than 27th February, 1953.

NEW YORK. ALBANY HOSPITAL. Internships and RESIDENCIES available in 750-Bed, general, private Hospital, directly connected to Albany Medical College. Approved for all major specialties, including psychiatry, and accepted by the U.S. State Department as member of Exchange Visitor Program. Annual salary range is $1020 for Intern to $2120 for Resident, with laundry, uniforms, room, and annual vacation furnished. All appointments begin July, 1953.

Address inquiries to Medical Director, Albany Hospital, Albany, New York.

NEW YORK. ALBANY HOSPITAL. Approved Internship, ASSISTANT RESIDENCY, and RESIDENCY in E.N.T. available 1st July, 1953, in Albany Hospital, affiliated with Albany Medical College. Salary $1020–$2120. Room, uniforms, and laundry supplied.

Inquire, Medical Director, Albany Hospital, Albany, New York, U.S.A.

NEW YORK. ALBANY HOSPITAL, a large general hospital affiliated with Albany Medical College, is offering 2 FELLOWSHIPS in Cardiopulmonary Physiology and Chest Diseases for 12 months beginning 1st July, 1953. All cardiac and pulmonary physiological studies will be done under the guidance of Specialists. Excellent experience. Good pay.

Address inquiries to Medical Director, Albany Hospital, Albany, New York, U.S.A.

NEW YORK. ALBANY HOSPITAL. Immediate opportunity ASSISTANT RESIDENCY PEDIATRICS at Albany Hospital, a 750-Bed private Institution associated directly with Albany Medical College. Uniforms, laundry, room, and food, plus $600 annually.

Send applications to—

Dr. JOHN K. MENEELY, Jr.,
Director of House Staff Education.
Albany Hospital, Albany, New York, U.S.A.

UNITED STATES. MOUNT AUBURN HOSPITAL, CAMBRIDGE, MASSACHUSETTS. Applications are invited for the positions of approved RESIDENCIES in Anesthesia for a 2-year period beginning 1st April, 1st July, and 1st October, 1953. Salary $1800 first year and $3000 second year, and full maintenance. Training in all branches of anesthesia. There is affiliation with other hospitals. Opportunity to attend various meetings in anesthesiology throughout the New England Area.

Applications, stating age, nationality, qualifications, and experience, together with the names of their referees, should be forwarded to the Director of Anesthesiology, Mount Auburn Hospital, Cambridge 38, Massachusetts. Travelling expenses to and from the U.S.A. will be paid, but particulars will be sent as soon as application is received. Please enclose recent photograph with application.

Public Appointments

HUDDERSFIELD. COUNTY BOROUGH OF HUDDERSFIELD. Applications are invited from duly qualified medical practitioners for the appointment of MEDICAL OFFICER OF HEALTH AND SCHOOL MEDICAL OFFICER of the County Borough of Huddersfield at a salary fixed in accordance with the terms of the Industrial Court Award (£1750 p.a., rising by 5 annual increments of £50 to £2000 p.a.). Applicants must possess a Diploma in Public Health or a similar qualification and should have had experience in the administration of the Public Health and School Medical Services. The person appointed will be required to reside in the Borough and to devote the whole of his time to the duties of the office and not to engage in private practice. The appointment is subject to the provisions of the appropriate superannuation act, to the passing of a medical examination by the Medical Officer of Health, and to termination by 3 months written notice on either side.

Applications, stating age, qualifications and experience, accompanied by 10 copies thereof and by 10 copies of 3 recent testimonials and endorsed "Medical Officer of Health," must reach me not later than Saturday, 28th February, 1953. Canvassing either directly or indirectly will disqualify.

HARRY BANN, Town Clerk.

The Town Hall, Huddersfield, 29th January, 1953.

AYR. ROYAL BURGH OF AYR. Applications for the post of ASSISTANT MEDICAL OFFICER OF HEALTH are invited from qualified medical practitioners. Candidates should possess the D.P.H. or C.P.H. The person appointed will assist the Medical Officer of Health generally in the work of the Health Department and the duties will include those of Assistant School Medical Officer in the Burgh and the conduct of clinics for maternity and child welfare and immunisation. The appointment will be terminable by 2 months notice on either side. The salary scale will be at the rate of £850 p.a. rising by annual increments of £50 to £1150. A car is available but an allowance of £75 p.a. will be paid if the Officer uses his own car in carrying out his duties. The successful candidate will be required to pass a medical examination for fitness to be included in the superannuation scheme.

Applications, with names and addresses of 2 referees, should be made to the undersigned, not later than 25th February, 1953.

R. L. LEASK, Medical Officer of Health.

Public Health Department, 34, Newmarket-street, Ayr.

DERBYSHIRE COUNTY COUNCIL. County Health DEPARTMENT. ASSISTANT SCHOOL AND ASSISTANT MATERNITY AND CHILD WELFARE MEDICAL OFFICER. Applications are invited from registered medical practitioners for this whole-time superannuable post. Salary £850 p.a., by annual increments of £50 to £1150 p.a., plus a car allowance on the Council's scale.

Particulars and application forms are obtainable from Dr. J. B. S. MORGAN, County Medical Officer, County Offices, St. Mary's-gate, Derby.

GOVERNMENT OF PAKISTAN. The World Health ORGANIZATION requires a PROFESSOR OF PHYSIOLOGY to be employed in Pakistan. Salary U.S. $7400 a year free of income-tax, plus subsistence and free quarters, for 1–2 year contract. Free return passage.

Write, giving age, full particulars of experience, and qualifications, and the names of 2 referees, to the Secretary, Ministry of Health, Division 5A, Savile-row, London, W.1.

NOTTINGHAM. CITY OF NOTTINGHAM. Health SERVICES. Appointment of SENIOR MEDICAL OFFICER for Maternal and Child Health. Applications are invited from medical practitioners (Male or Female), for this post. The duties will be those of Medical Supervisor of Midwives and of administration of the Maternal and Child Health Department, under the general direction of the Medical Officer of Health. Applicants should have had experience in administrative and clinical work in connection with Maternal and Child Health. Preference will be given to candidates possessing higher qualifications; salary £1250–£50–£1650 p.a. The appointment will be subject to 3 months notice on either side and to the provisions of the National Health Service superannuation regulations and the Local Government Superannuation Act, 1937.

Conditions of appointment and forms of application may be obtained from the undersigned to whom they must be returned, accompanied by the names of 2 referees, not later than 27th February, 1953.

T. J. OWEN, Town Clerk.

The Guildhall, Nottingham, January, 1953.

SUDAN GOVERNMENT. The Ministry of Health, Sudan Government, invites applications for 2 posts of MALE MEDICAL SPECIALISTS. Candidates should be in the Senior Registrar grade under the National Health Service, and should possess the qualification of M.R.C.P. or should be aged 30–32 and possess the higher qualifications plus considerable experience. Appointment will be on probation for short-term contract (with bonus), up to 6 years. Salary scale ranges from £E2000 to £E3000 (annual increases). Starting-rate of pay is fixed according to age, qualifications and experience of selected candidates. An outfit allowance of £E50 is payable when the contract is signed. No income-tax is at present payable in the Sudan. Free passage on appointment. Annual leave after the first tour. Candidates for this post may apply for secondment from the National Health Service for period of 3 years under the terms of circular letter No. RHB/(52)106BG(52)101 of 30th September, 1952, in which case the contract with the Ministry of Health, Sudan Government, will be for that period.

Full particulars and application forms may be obtained on application to Dr. E. P. PRATT, 93, Harley-street, London, W.1.

SWANSEA. COUNTY BOROUGH OF SWANSEA. Applications are invited from duly qualified medical practitioners for the post of ASSISTANT MEDICAL OFFICER. Applicants must have had postgraduate resident hospital experience and should be under 45 years of age unless already holding a similar superannuable appointment. Salary £850–£50–£1150 p.a.

Application forms may be obtained from the Medical Officer of Health, Public Health Department, The Guildhall, Swansea, to whom they should be returned not later than Friday, 20th February, 1953. Canvassing, either directly or indirectly, is a disqualification.

T. B. BOWEN, Town Clerk.

The Guildhall, Swansea, 27th January, 1953.

WESTMINSTER CITY COUNCIL AND HOLBORN BOROUGH COUNCIL. Joint appointment of PRINCIPAL ASSISTANT MEDICAL OFFICER OF HEALTH (permanent superannuable post). Salary £1250–£50–£1400 p.a. Applicants to be registered medical practitioners and to hold a registered Public Health qualification; age not to exceed 45 years. The person appointed will act as Principal Assistant Medical Officer of Health for the 2 Boroughs and (subject to the approval of the Minister of Health) as Deputy in the absence of both Medical Officers of Health at the same time. His services will be allocated in the proportion of three-fourths to Westminster; one-fourth to Holborn.

Applications marked "Principal Assistant Medical Officer of Health" stating age, war service, qualifications, present and past appointments, with copies of 3 recent testimonials to the Town Clerk, Westminster City Hall, Charing Cross-road, W.C.2, by 14th March, 1953.

FACTORY DOCTORS: Factories Acts, 1937 and 1948. The following appointment as Appointed Factory Doctor is vacant. Apply to Chief Inspector of Factories, 8, St. James's-square, London, S.W.1.

District	*County*	*Latest date for receipt of applications*
AUDLEY ..	.. STAFFORD	.. 28TH FEBRUARY, 1953

LEEDS. CITY OF LEEDS. Public Health Department. Applications are invited from qualified and registered medical practitioners for 2 posts of ASSISTANT MEDICAL OFFICER for Maternity and Child Welfare. Applicants should have had postgraduate experience, preferably including obstetrics, antenatal work, and pædiatrics. The salary is on a scale of £850, rising by increments of £50 to a maximum of £1150. The persons appointed will be required to pass a medical examination and to contribute to the superannuation fund.

Application forms and particulars of the duties may be obtained from the undersigned at the Public Health Department, 25, East-parade, Leeds, 1, and completed applications should be returned by 10 A.M. on Monday, 2nd March, 1953. Canvassing in any form, either directly or indirectly, will be a disqualification.

I. G. DAVIES, Medical Officer of Health.

General Practice

For an Executive Council post apply on form E.C.16A obtainable from the council. Mark envelope "Vacancy."

COUNTY BOROUGH OF CARDIFF. Applications invited to undertake GENERAL MEDICAL SERVICES on new Llanrumney Housing Estate now being erected in Cardiff (no lists of patients available for transfer). 3 sites being reserved on such Estate for this purpose to be leased to successful applicants at a ground rent for specified term of years and such lessees to erect substantial house at own cost in accordance with plans approved by Local Authority.

Applications also invited from doctors already practising under the Act in Cardiff to open branch surgeries at, or adjacent to, such Estate, a selection of only 2 applications in this respect to be made.

Applications in writing on Form E.C.16A (obtainable from address below) should be sent to undersigned (who should be contacted, if necessary, for fuller information) not later than 7th March, 1953.

B. A. J. GRIFFITHS, Clerk, Cardiff Executive Council.

32, Cathedral-road, Cardiff.

LITTLE MILTON. Applications are invited for Vacancy (rural and dispensing) due to death. List approximately 1950. Residence and surgery may be available. Apply, on Form E.C.16A, not later than 24th February, 1953.

V. R. PARRY, Clerk,

Oxford County and City Executive Council.

73, George-street, Oxford.

Hospital Services: Non-Medical Appointments

NOTTINGHAM NO. 2 HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from Science Graduates for the appointment of a BIOCHEMIST within the Nottingham No. 2 Group of hospitals. The person appointed will work under the direction of the Chemical Pathologist at the City Hospital, where there is a fully equipped Biochemical Laboratory. Salary in accordance with experience and qualifications, based on Whitley Council Scales, within the range of £425–£730 p.a.

Applications, stating experience, and qualifications, together with the names of 2 persons to whom reference can be made should be sent to J. H. HARGREAVES, Group Secretary.

Sherwood Hospital, Hucknall-road, Nottingham,
30th January, 1953.

Miscellaneous

To non-professional posts the Notification of Vacancies Order 1952 applies

Imperial Chemical Industries Limited, Alkali Division, Winnington, Northwich, Cheshire, require full-time Assistant Medical Officer at their Chemical Works at Northwich. Previous experience in industry desirable. Compulsory pension scheme. Housing available. Commencing salary according to age and experience to be discussed at interview, but not less than £1320 p.a. Engagement subject to satisfactory medical examination and references.—Write to Staff Manager, giving details of age, qualifications, experience and availability.

Partner required for West End practice. Suit Physician or Surgeon, general or special (other than psychiatry). Radiological and other diagnostic facilities.—Particulars to: Address, No. 783, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Bickley, Kent. Residence of the late Dr. Wyn Thomas has been converted into 2 up-to-date houses 4 and 5 bedrooms. Attractive gardens, detached garages, £4750 and £5500.—Rav. 5236–1296.

Charming House, converted 17th-century cottages, beautiful garden. 5 bedrooms, central heating, main water, electricity. With foreman's cottage, small market-garden and cherry orchard. Herts. (50 mins. Harley-street.) Owner (Dr.) taking academic post North.—Address, No. 782, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Austin A.30 Seven and A.40 Range. A limited number of orders now acceptable from proven essential users for delivery ahead. Brochures from Austin House, 140/144, Golders Green-road, London, N.W.11.

"Pregnancy Diagnosis by the Xenopus Method." 24-hour service.—Send specimen of urine and £1 1s. fee to: WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (Telephone: MUSeum 5386–7).

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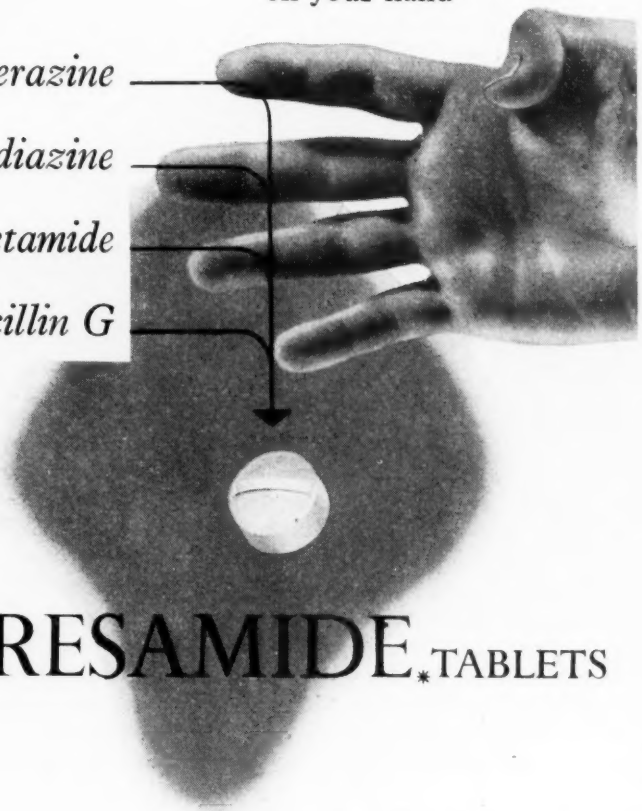

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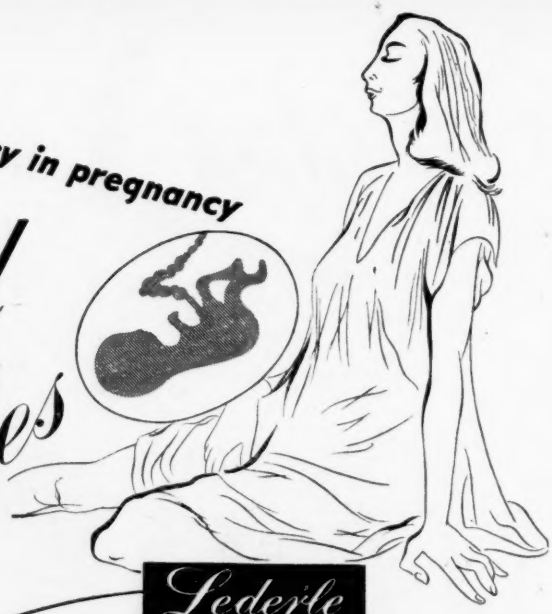

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